December 1972

Smithsonian

René Dubos finds Man often improves nature (see back cover and p. 18)

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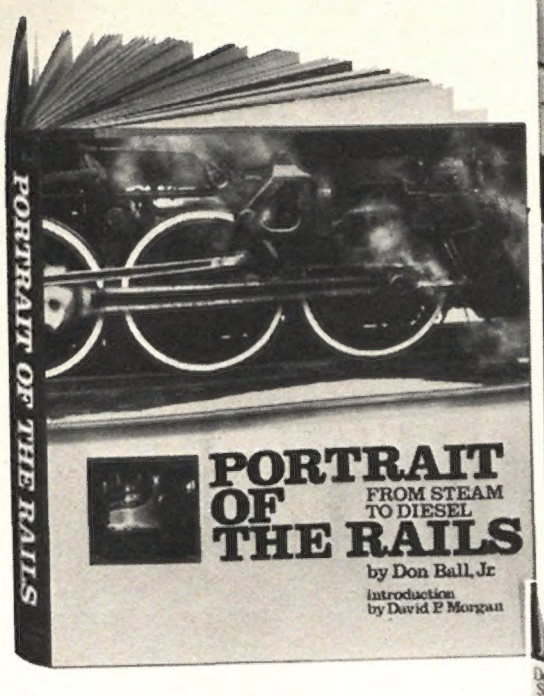

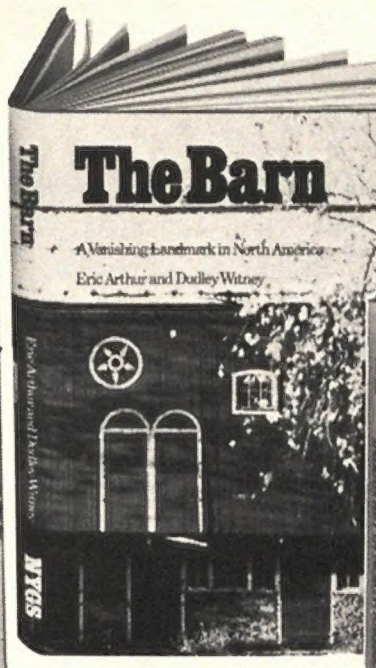

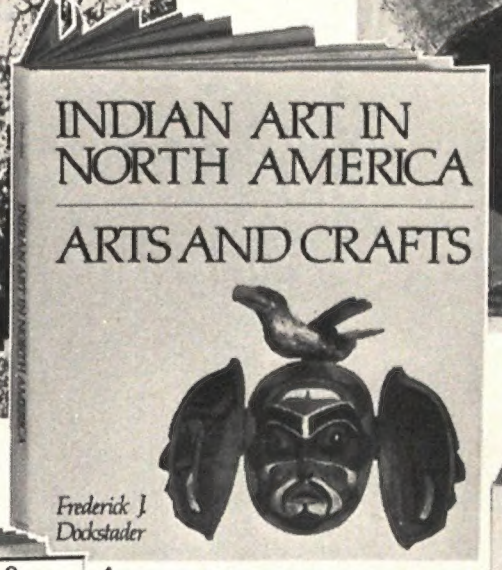

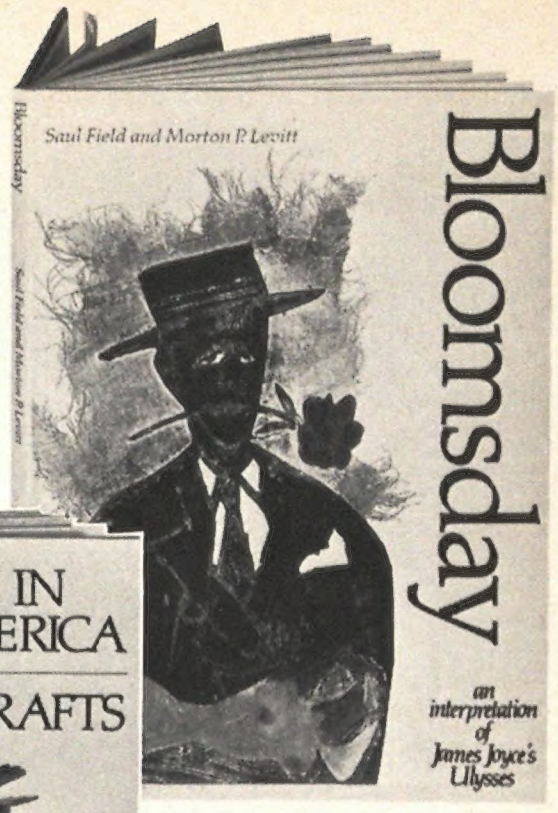

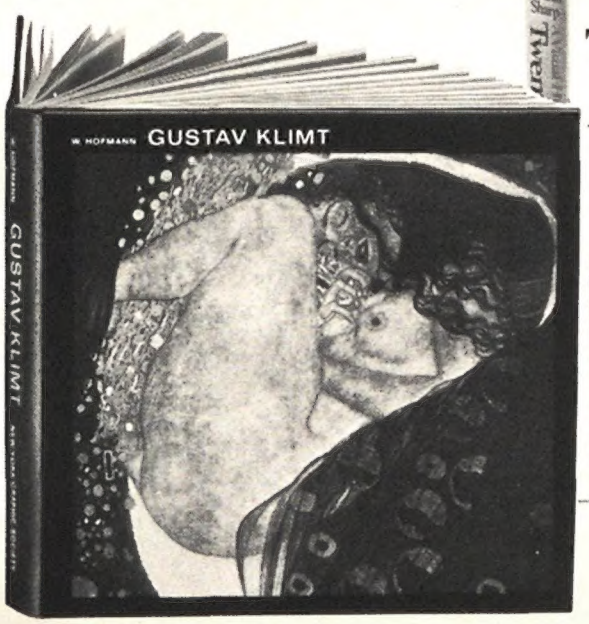

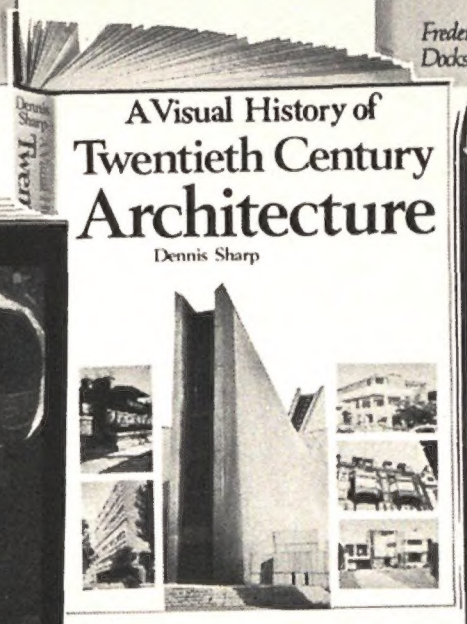

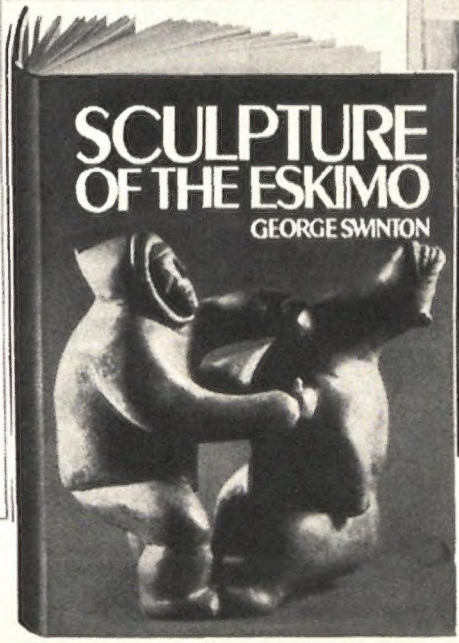

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December 1972

Smithsonian

Volume 3, Number 9

Table of Contents

COVER: The allées in the park of the Chateau de Chantilly show how nature was enhanced by a creative designer in the 17th century (see page 18)
Photograph by Rene-Jacques

4 The view from the castle: Secretary Ripley, the host, expects thousands of AAAS members meeting here to discuss their work *and* the role they play in society

6 Phenomena, comments and notes: A white giraffe, the cultured lobster, literacy test for a chimp and a battalion of short-lived troubles

14 Letters to the Editor

18 Man's creative touch often improves the land even though he is beset by ecological devils of his own making
By René Dubos
Photographs by Terence Spencer, David Lees, Karl Snyder and Loomis Dean

30 The Lafayette Escadrille: an exciting era
By J. Timberlake Gibson

38 Physicists probe the ultimate source of energy—their knowledge of ionized gases and sophisticated technology may lead to an inexhaustible power supply
By Ben Bova

49 The golden lion marmosets are imperiled, but conservation efforts may yet save them
By John Perry

54 One billion Christmas stamps from a little corner of a medieval painting

56 The humor, sharp but sympathetic, of cartoonist Giles has amused the British for 30 years
By Timothy Green

64 Dolls: Once beloved playmates, they are now prized collectors' items
Photographs by Herman Landshoff

68 Renewed acclaim for Frederick Law Olmsted, the father of American landscape architecture

76 The versatile cockroach, a longtime companion, deserves not only our hatred but a little respect
By Laura Marsh Henning
Color drawings by John Huehnergarth

84 Book reviews

90 December events at the Smithsonian

92 Soothing sand for tense tycoons
By Patrick Ryan

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Secretary Ripley's comments

The view from the castle

At an annual meeting in Washington this month, a horde of scientists will air their recent work and their doubts about science's role

December means many things in the United States, but for scientists it has long meant a trek to one city or another for the annual meeting of the American Association for the Advancement of Science. This year, in the week between Christmas and the New Year, some 9,000 scientists will be in Washington, jamming its hotels and filling its meeting rooms with hundreds of hours of lectures and discussion.

The Smithsonian has always taken an avuncular interest in the AAAS; for most of the first half of this century, the AAAS headquarters was housed here in the red stone castle on the Mall. So we especially cherish the pleasurable duty of serving as leading sponsor for this year's gathering. And like any uncle with the wisdom of age, we hope not only to be hospitable but to listen attentively, for in the rich and varied fare of this meeting two major themes will predominate, both of them matters of the utmost interest to all of us at the Smithsonian.

First, a number of sessions will attempt to achieve a sharp focus on the often confusing dynamics of science, technology and government: What is the anatomy of decision-making in the creation of science policy? How, for example, was policy made or not made in the case of the SST? How can a representative government, a scientific establishment and an only partially (alas) informed citizenry combine to make prudent decisions in matters with such overarching effects on all of society?

The other major focus is on the way humans learn. This has traditionally been the realm largely of educators and psychologists, but recently the neurobiologists have begun to give us an objective glimpse into the workings of that instrument with which we all must learn—the brain.

A major symposium will review this sophisticated body of knowledge, explore the revolutionary concepts of learning that are emerging, and ponder their implications for the design of environments for learning. I have been struck by the cruel contrast between the bleak environment of our nation's schools and the richness of the natural environment in which human learning capacities evolved. Museums, it seems to me, have a special responsibility in this area, and may help to counteract the tendencies toward uniformity which one finds not only in classrooms but in most parts of our modern environment.

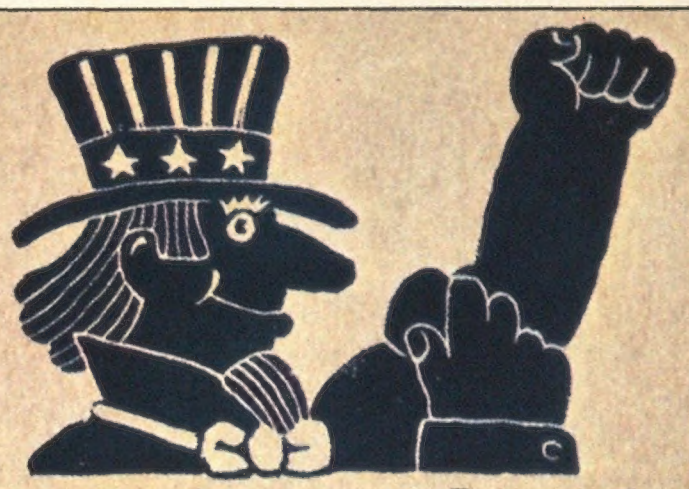
So we are profoundly interested in this symposium and the others that are related to it. For example, one session will bring together the best evidence so far accumulated concerning sex differences and their contribution to the learning of social roles.

In these and other sessions, this 139th meeting of the AAAS will reflect the best hopes of science—and also the doubts that beset it, doubts about the role of science, about past enthusiasms for science as an end in itself. We should welcome these concerns.

The glamour that formerly surrounded scientists was certainly exaggerated. To some of us, the shifting of priorities may be irksome, but scientists should above all learn to be humane, to be humble, and to remind themselves of the sense of dedication and self-effacement that went into the founding of this, our venerable and wholly necessary association for the *advancement* of science.

S. Dillon Ripley

Two weeks in the hospital can cost you two months in wages.



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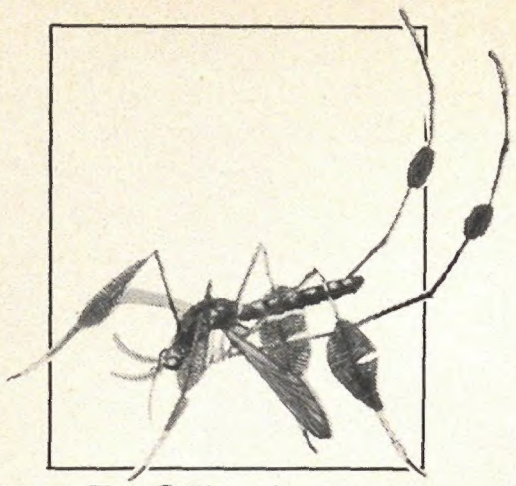

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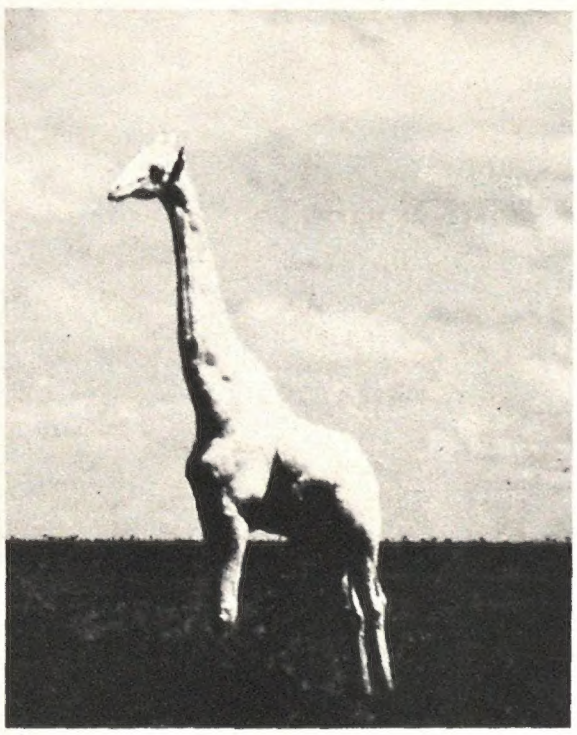
Phenomena, comments and notes

A white giraffe, a Serengeti pest, vengeance on television, the cultured lobster and the literate chimpanzee

On a recent safari in Kenya, a Smithsonian Associate, William H. Price II of Toledo, photographed the white giraffe below, writing that "the eyes did not show pink as most albino animals do." Apparently several hunters in East Africa have seen white giraffes here and there (though most tourists have not). Certainly they are a rare phenomenon.

On the other hand, another kind of creature is becoming so common in Serengeti National Park that Brian Bertram of the Serengeti Research Institute was prompted to report on its anatomy and behavior in *Africana,* the quarterly magazine of the East African Wild Life Society.

White giraffe near Narok, Kenya



Called minibi, they occur in several color phases, often with markings similar to zebras and giraffes, though "they can always be distinguished from these latter species by the absence of a tail." They are nomadic, gregarious and noisy, making a rumbling sound as they migrate across flat open country which is their main habitat: They "tend to faint from exhaustion on steep hills."

Minibi are "intensely inquisitive creatures, and frequently cluster round predators for long periods; on such occasions they utter a series of clicking and whirring sounds heard at no other time." Because of their increasing numbers and the resulting harassment of other species —including, it seems, resident scientists— some Serengeti researchers believe that minibi (or as the creature is known in the singular, the minibus) should be eradicated from the Park.

The cultured lobster

Lovers of lobster, nervous over reports of diminishing catches and of the ill-effects of oil pollution on these crustaceans (see SMITHSONIAN, August 1972), can take heart. It looks as though lobsters can be raised on farms.

Workers at the Massachusetts Lobster Hatchery on Martha's Vineyard Island informed *Science* magazine that they have managed to encourage lobsters to reach sexual maturity in less than two years, rather than the usual eight years. This was done by raising the water temperature by a few degrees. Even faster growth rates can be achieved, they said, by then selecting the fastest growing larvae to produce the next generation.

Yet another means of getting more lobsters faster came to light from an accidental discovery by scientists of the National Oceanic and Atmospheric Administration (NOAA), who noticed in their Maine laboratory that blind juveniles grow at a rate about ten percent greater than normal. Lobsters are occasionally blinded in the process of molting and you can recognize a blind lobster because it is bright orange-red (even before boiling), rather than the usual rusty green. It has been suggested that a growth-inhibiting hormone in the eyestalk is eliminated or rerouted when a lobster loses its sight.

So one may envision warm-water farms with thousands of bright orange, unseeing

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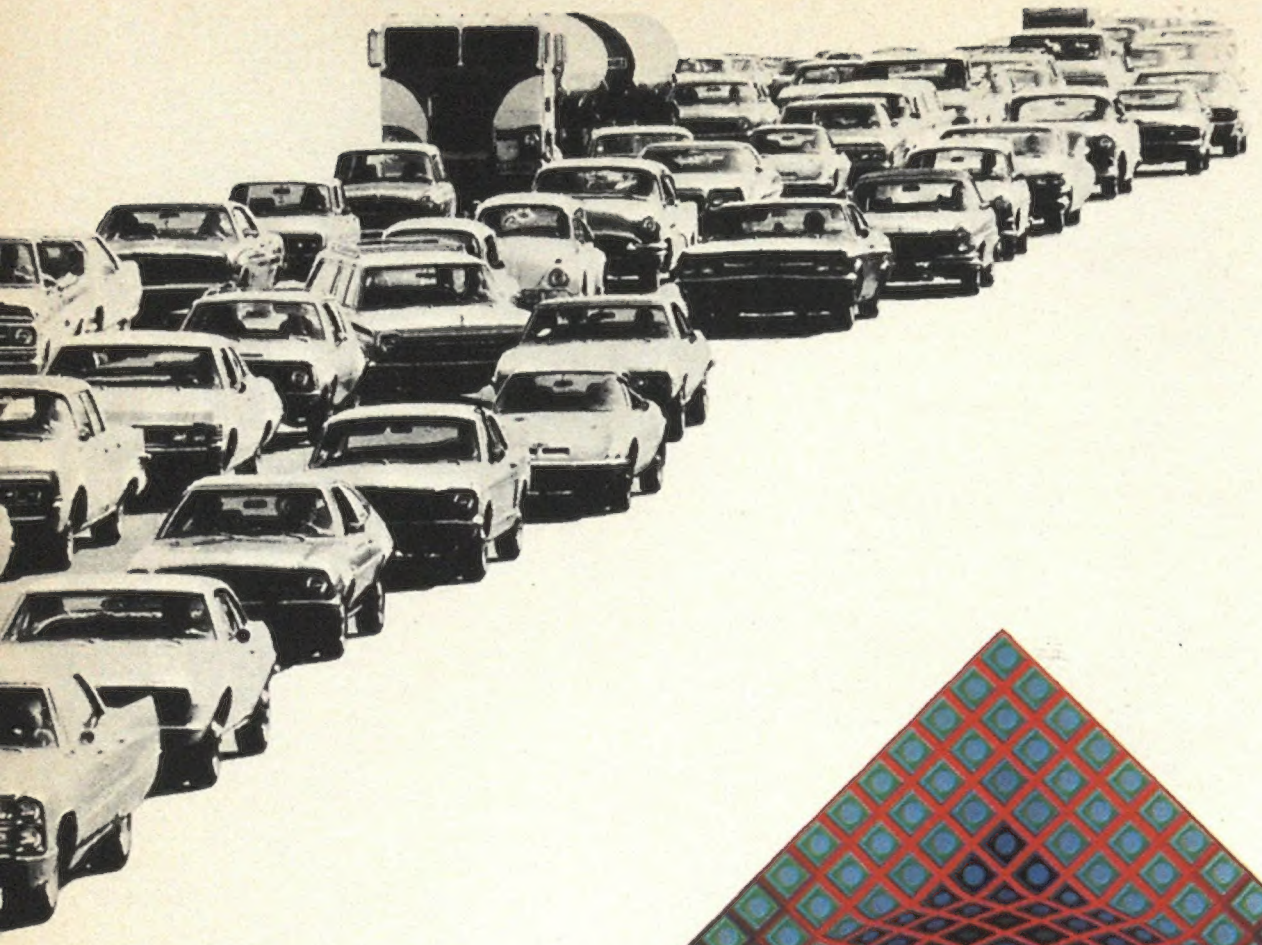
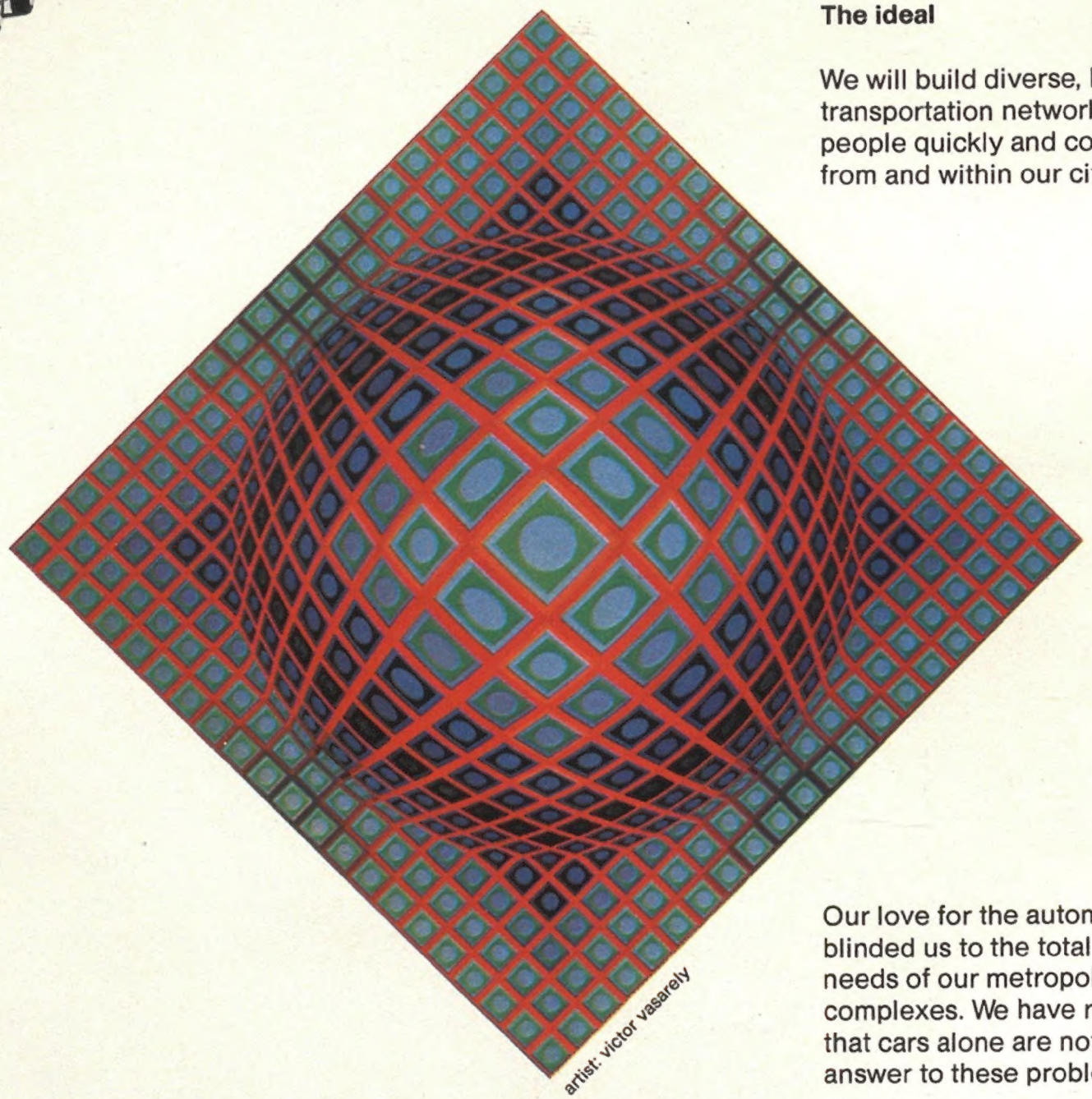


The real

Our cities have been tied up in stifling automotive congestion because we have emphasized cars at the expense of other means of transportation.



artist: victor vasarely

The ideal

We will build diverse, balanced transportation networks that move people quickly and comfortably to, from and within our cities.

Our love for the automobile has blinded us to the total transportation needs of our metropolitan complexes. We have refused to see that cars alone are not the total answer to these problems.

It's time we opened our eyes to the urgent need for balanced mass and private metropolitan transportation networks. Developing them will take innovative planning, public support and cooperation among all levels of government.

But we must begin now to untangle our growing metropolitan complexes—even if it means banning the car from certain parts of our cities.

AtlanticRichfieldCompany

lobsters clattering about, hurrying from one molt to the next and ultimately to your table.

Television producers beware

It has been established that if you hum at the proper frequency while watching television, horizontal gray bands will appear on the screen. They will be stationary or will move up or down, again depending on frequency, according to two Floridians writing in *Nature* magazine.

The cause? It seems that humming makes your eyeballs vibrate sufficiently to displace the image on the retina. And as television fare grows ever more anemic, this may become a common phenomenon. Ho hummmmmmm.

A battalion of short-lived troubles

Subscribers to the news from the Center for Short-lived Phenomena might well have seen the approach of the apocalypse in the flood of small catastrophes (see Dubos, page 18, for a generally more euphoric view). Volcanoes, including Krakatoa, had been erupting in various parts of the planet. Then in mid-September algae bloomed unexpectedly off the Massachusetts coast, causing the much-publicized "red tide" that shut down parts of the shellfishing industry for more than two weeks.

The toxic algae accumulated in the digestive tracts of clams and mussels which, unharmed themselves, proved lethal to hundreds of birds and poisoned at least 25 persons. The red tide extended, at its peak, from Cape Cod north to Portland, Maine, where officials were already engaged in a three-month effort to clean up a large section of coastline that had fallen victim to an oil spill. The Norwegian tanker, *Tamano,* had struck a ledge, spilling some 100,000 gallons of oil into Maine's frigid waters, a grim reminder of things to come if a controversial deepwater oil port is developed on the Maine coast.

Then, towards the end of September, just as the red tide was receding, an oil storage tank in Salem, Massachusetts, let go and poured 30,000 gallons into *those* already troubled waters.

A few days later, around the globe, Japan's Minamidake crater "blew up with a terrific explosion (18th explosion this year)" and four days after that, on

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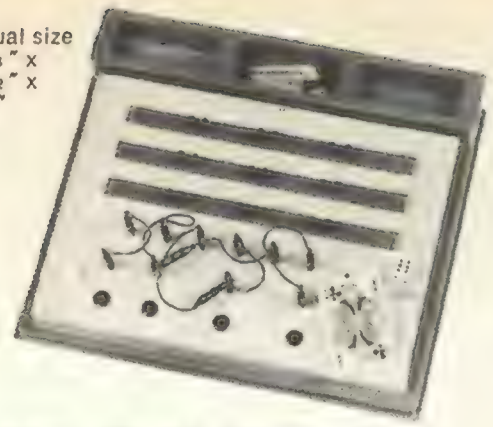

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October 6, it erupted twice more. The day before *that* the Center had reported the continuing bewilderment of Florida researchers over the "lethal yellowing" of coconut palms in the Miami area, a sinister disease that was first noticed killing palm trees there a year earlier and was spreading slowly but surely to other areas. A few days later, thousands of gallons of oil spilled from a break in the Texas-New Mexico pipeline.

Meanwhile, the U.S. National Weather Service had been tracking a layer of smoke and haze that was moving across the western Pacific, lowering the visibility to three miles in such paradises as Ponape. Apparently it was a result of the earlier volcanic eruptions in the Krakatoa area and needed only a shift in the southwesterly winds to go away.

But there was no such simple explanation or cure forthcoming for another disheartening event (which was somehow missed by the Center): Racing pigeon fanciers in Virginia announced that, after a series of five pigeon races, only 11 percent of 325 birds had returned.

A literacy test

After last month's unhappy news that wild chimpanzees have been found guilty on two occasions of infanticide, it is a relief to be able to balance the ledger: Another captive chimp has been taught to read and write. Ann Premack and her husband, David Premack of the University of California at Santa Barbara, write proudly in *Scientific American* about Sarah, whose vocabulary extends to about 130 "words" and who understands sentence structure and the concept of class (that is to say, such categories as color, sex and age).

Sarah has learned all of this by means of plastic symbols such as those shown on the next page.

With these "words" Sarah can explain that "apple different banana" and describe matters of a conditional nature, such as "Sarah take apple, if-then Mary no give chocolate Sarah."

"Once," say the Premacks, "she wrote 'Give apple Gussie,' and the trainer promptly gave the apple to another chimpanzee named Gussie. Sarah never repeated the sentence."

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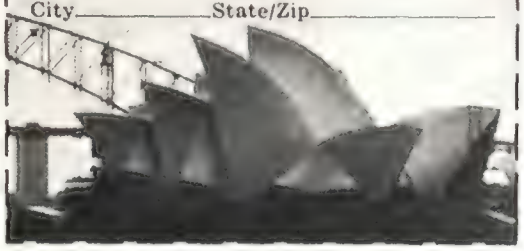

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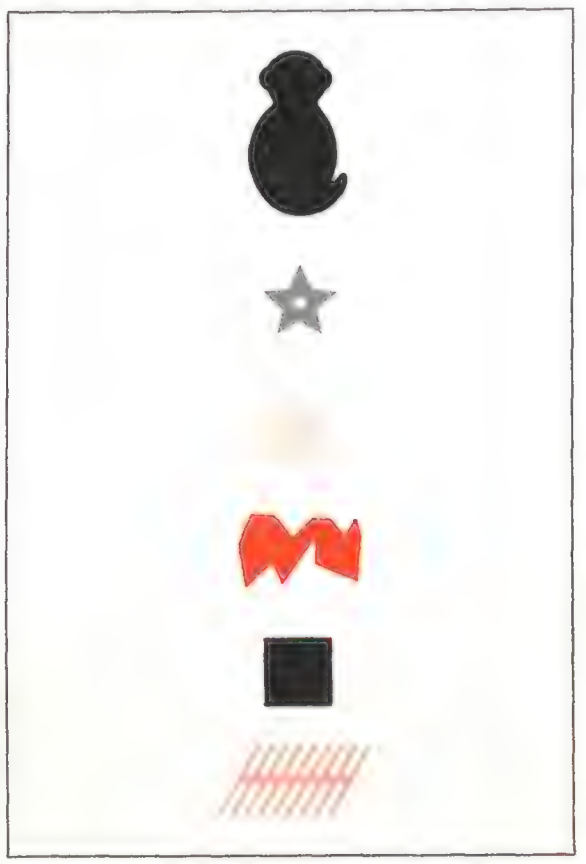

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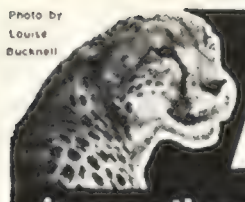

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Letters to the Editor

Gold sculpture

Dear Sir: In regard to Paul Desautels' article on the gold sculpture of Simon Yavitz, you might be interested to know that Palm Springs also has a master goldsmith—my husband, Vern Hurst. He has carved small bird and animal figures (see below) for some of his pieces, which are currently on exhibit at the Artisans Workshop in Palm Springs.

Mrs. Vern E. Hurst
Palm Springs, California

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Prairie dogs

Dear Sir: In your article on prairie dogs, one picture shows a group eating something that looks like crackers. The photographer evidently ignored the sign at the entrance to Prairie Dog Town, which warns: "Prairie dogs . . . need wild food so please don't feed them."
Mrs. William Stevens
Chicago, Illinois
This picture and some others were not taken in Prairie Dog Town. Ed.

The view from the castle

Dear Sir: Regarding Secretary Ripley's comments, I heartily support a total moratorium on whaling until populations rise. However, I vehemently oppose the concept of total protectionism, especially when anthropomorphizing is used to support the proposition.
William A. Richkus
Trenton, New Jersey
Secretary Ripley was not supporting anthropomorphism, but simply making the observation that "Whales are now thought of in the United States as being closer in intelligence to humans than almost any other animal." Ed.

Rainmaking

Dear Sir: In regard to your article, "Rainmaking is now almost a science but its legal status is still murky," you might be interested in related material that appeared recently in a brochure from the Illinois Institute for Continuing Legal Education. One of the articles on climate modification, written by the University of Illinois' Dr. Norman Krausz and his research assistant Michael McElvain, provided this footnote:

Bellamy Partridge, in his book, *The Country Lawyer,* reports that the earliest court case in this field was Dodd vs. Duncan McLeod. This case arose in the late 1800s in upstate New York and resulted from a severe drought, lasting over several months, that had brought the farmers of the area to desperate straits.

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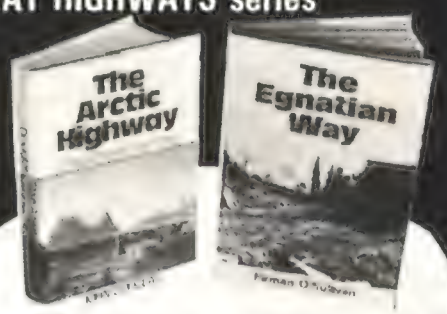

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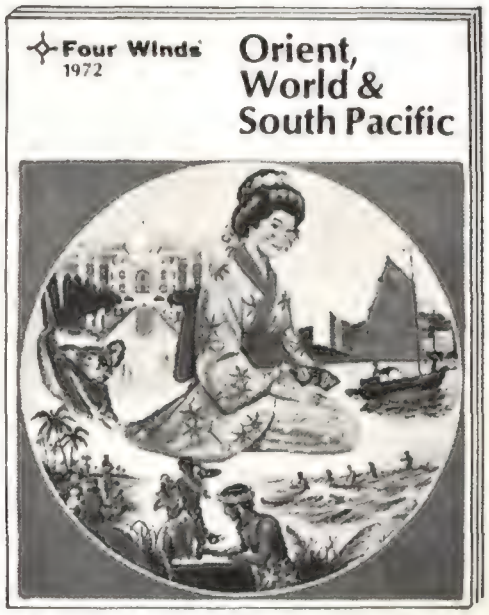

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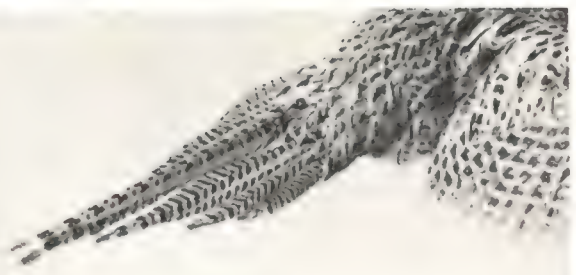

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Dodd was so angry at the loss of his barn that he . . . commenced a lawsuit seeking $5,000 in damages, on the ground that the loss of the barn was a direct result of the prayers organized and led by Reverend McLeod. It appeared for a time at the trial that the plaintiff might win his case, but the defense counsel finally persuaded the court to dismiss the action on the ground that defendants had prayed only for rain and that the lightning had been a gratuitous gift of God.

The case was not appealed.

J. David Bone
Jacksonville, Illinois

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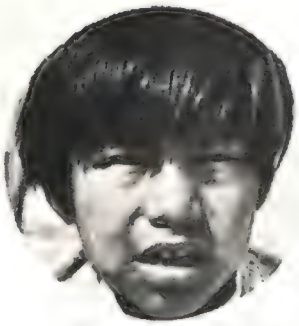
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By René Dubos

'Replenish the Earth, and subdue it'
Genesis 1:28

Human touch often improves the land

Though beset by ecological devils of his own making, Man has frequently helped nature, creating the most admired 'natural' landscapes

On a trip from India to Europe at the turn of the century, the Indian author Rabindranath Tagore was overwhelmed by the quality of the land he saw by train from Brindisi to Calais. The European countryside appeared to him as a loving creation of the peasantry. "I watched with keen delight and wonder that continent glowing with richness under the age-long attention of her chivalrous lover, western humanity .... Love and action are the only media through which perfect knowledge can be obtained. . . ."

I had these words of Tagore in mind while attending the U.N. Conference on the Human Environment held in Stockholm last June. The delegates had little opportunity to discuss the pleasurable aspects of the environment: meadows and farmland, flower gardens and parks, let alone cottages, mansions and monuments. They were preoccupied instead with water and air pollution, the depletion of natural resources, crowding in human settlements—in brief, the thousand devils of the ecological crisis.

There were good reasons, of course, for focusing the Stockholm Conference on environmental degradation. But I believe there is danger in emphasizing only the destructive aspects of Man's impact on his environment. Our civilization will become increasingly spirit-

Hedgerows and plows tamed the English forest, making mosaics of the land, such as this near Norwich.

Photographs by Terence Spencer, David Lees,
Karl Snyder and Loomis Dean

less and dreary if we do not learn to recognize and cultivate *positive* environmental values, to remember that Man has frequently improved on nature by transforming it either for profit or for love. Intact, many of the Earth's potentialities remained unexpressed until they were brought out by human labor, imagination and, indeed, fantasy.

Last summer, while visiting the Aegean Islands, I realized how much Man's presence can diversify and enrich the creativeness of nature. Our ship stopped at Thera (Santorini) late at night and I first viewed the island in the early morning as I stepped from my cabin: the incredibly perpendicular cliff, 1,000 feet high, plunging into water 1,200 feet deep. On its very upper edge, white houses and colorful church domes gleamed in the sun against the luminous sky.

I knew that the cliff resulted from the tremendous volcanic eruption which had split the island 3,500 years ago and buried its remnants (SMITHSONIAN, January 1972). The explosion may have been as much as four times more violent than that which destroyed two-thirds of Krakatoa Island in 1883.

Gradually the typical Aegean flora and fauna returned. And unlike Krakatoa, men also came back and developed several consecutive civilizations. These have had their ordeals but all have generated some form of wealth from the tormented Aegean rock. If it had not been for the presence of men, Thera would not have produced the heady wine and tasty small tomatoes for which it is now famous. Despite its lack of water and the poverty of its land, Thera is a showpiece among the Greek Islands. It illustrates that the *human* quality of the environment may transcend physical and ecological considerations.

Whatever the characteristics of the environment, a new kind of value always emerges with intimate and long association between Man and landscape. According to Robert Graves, the Moslems use the word *báraka* to express the sense of blessedness that attaches itself to places and objects after years of loving care. This must be the same notion that Tagore had in mind when he wrote of the wooing of the Earth—the ". . . harmony with nature attained through intelligent dealings."

While in Greece last July, I visited, one late afternoon, the ancient Byzantine monastery of Moni Kaisariani, a few miles southeast of Athens. It nestles on the slopes of Mount Hymettus at the 1,100 foot elevation; from it a trail meanders through an almost treeless landscape among thyme, lavender, sage, mint and other aromatic plants. The marblelike rock formations of Hymettus are denuded, but the luminous sky gives an architectural quality particularly bewitching under the violet light of sunset.

René Dubos, a professor emeritus at Rockefeller University, is an articulate humanist in the environmental movement. He wrote the lead article in SMITHSONIAN'S *first issue (April 1970).*

Nibbling in an olive grove, goats continue their classical role in shaping the Greek landscape.

A short distance from the monastery, the trail reaches an outcrop of rocks which affords a sudden view of the Acropolis, Mount Lycabettus and the whole city of Athens. As is so often the case in Greece, the buildings—whether pagan, Christian or simply urban—derive an extra dramatic quality from their placement in nature. And nature itself has been humanized by several thousand years of use. The grounds associated with the monastery have the traditional almond and olive trees of the Greek landscape, but these originated long ago in south central or southeastern Asia. Similarly, the road back to Athens is shaded with eucalyptus trees, but these were introduced from Australia. Beyond the monastery along the trail the Hymettus is stark and luminous, but the rocks became clearly visible only after deforestation had led to erosion during historical times.

Ecologists and historians agree that most of Greece was originally wooded; its austere rock structures used to be masked by soil and trees. What we regard as the Greek landscape—stark and almost treeless—is a consequence of deforestation followed by erosion. The slopes have been kept denuded by rabbits, sheep and especially goats which continuously destroy new growth. Forces set in motion by Man thus let light play its bewitching game on the white framework of Attica.

Writers of the Classical, Hellenistic and Roman periods were aware of the transformations brought about by deforestation. In *Critias*, Plato compared the land of Attica to the "bones of a wasted body . . . the richer and softer parts of the soil having fallen away, and the mere skeleton of the land being left." In preclassical times, according to Plato, the dwellings were made with "roofs of timber, cut from trees growing there, which were of a size sufficient to cover the largest houses." Later, however, "the mountains now only afford sustenance to bees." The famous honey of Hymettus is thus linked to deforestation which favored the growth of sun-loving aromatic plants.

Divine nudity and a painful symbol

The Illisus River, which has its source on Mount Hymettus and runs through Athens, was still a lively stream in Plato's time. On a hot day in midsummer, Socrates and Phaedrus walked toward a tall plane tree on the banks of the Illisus a short distance from the Agora. As reported in the famous dialogue, they discussed rhetoric, philosophy, creativeness and love while cooling their feet in the water of the stream which they found "delightfully clear and bright." Today, the Illisus is dry much of the year and serves as a sewer covered by a noisy roadway. There could not be a more painful symbol of the damage done to the human quality of life by Man's *mismanagement.*

The deforestation of Greece is now far advanced but not irreversible. Wherever a serious effort is made to stop lumbering and prevent grazing, trees and wild flowers reappear spontaneously. With proper management, the mainland and islands could once more be wooded as they were before the classical era, bringing climatic and agricultural improvements. As Henry Miller says in *The Colossus of Maroussi*, "The tree brings water, fodder, cattle, produce . . . shade, leisure, song. . . . Greece does not need archaeologists—she needs arboriculturists." Yet reforestation would make the landscape very different from the classical image we now have of it. For the Greek poet Kostes Palamas (1859-1943) in his poem, "The Satyr or the Naked Song," the stark, eroded structures of the present landscape triumphantly symbolize the "divine nudity" in Greece. And Henry Miller, again, marveled at the rocks which "have been lying for centuries exposed to this divine illumination . . . nestling amid dancing colored shrubs in a blood-stained soil." These very rocks are symbols of life eternal.

The Greek mountains were probably frightening

and difficult to penetrate when they were completely wooded. After deforestation and erosion, they acquired some of the qualities of a park; the traveler could move on their opened surfaces, his vision floating into a distance of golden light. I have wondered whether the dark and tormented divinities of the preclassical period did not become more playful, and reasonably human, precisely after they emerged from the forests into the open landscape. Would logic have flourished so well if Greece had remained covered with an opaque mantle of trees?

There is no doubt that man spoiled the water economy and impoverished the land when he destroyed the forests of the Mediterranean world. But it is a fact also that deforestation allowed the landscape to express certain of its potentialities which had remained hidden under the dense vegetation. It revealed the underlying architecture of the scenery and perhaps helped the soaring of the human mind. The full expression of the Mediterranean genius may require both the cool mysterious fountains in the sacred groves and a bright light shining on the denuded rocks. Ecology becomes a more complex but far more interesting science when Man is accepted as an integral part of the landscape.

In most parts of the globe, just as in Greece, men have been humanizing the Earth since the late Stone Age and have literally shaped the landscapes in which we live. Much of the Earth's surface used to be covered by forests and marshes. This seemingly endless green mantle had an overpowering grandeur which can still be experienced in the tropical jungle. But it masked some of the Earth's most interesting aspects.

Almost everywhere, farmland, pastures, gardens and parks have been created by profoundly transforming the natural environments. Wilderness has thus been replaced by man-made ecosystems which have become

so familiar that they are commonly assumed to be of natural origin. In fact, it is Man who has created most of the "nature" celebrated by artists and poets.

The moors of England and Scotland used to be heavily wooded and emerged as moorland only after deforestation, which began during the Bronze Age and had essentially been completed at the end of the Middle Ages. In contrast, the region now occupied by the San Francisco Presidio was essentially treeless until the 19th century; it now differs from the surrounding northern tip of the San Francisco peninsula because Major W. A. Jones of the Corps of Engineers proposed in 1883 a systematic program of landscaping

An Ohio Amish farmer has created a gentle geometry that contrasts woods with man-made meadows.

with a great variety of trees and shrubs. Major Jones recommended that "Young trees should be fenced off to keep out grazing cattle," and that "Growth [be] pretty much restricted to eucalyptus and evergreens because deciduous wouldn't grow—too windy."

Man's influence on European landscapes has been exerted for so long that it has created a second nature, not always readily differentiated from primeval nature. Like the rest of northern Europe, the Ile-de-France region where I grew up was almost completely wooded at the beginning of the Christian era. Trees still grow luxuriantly there wherever they are given a chance. In all directions around Paris, there are large forests such as those of Rambouillet, Fontainebleau, Villers-Cotterets, Compiègne. The smaller and less famous Carnelle Forest 20 miles north of the city is of special interest to me because I used to take romantic walks to its well-preserved druidic dolmen near Beaumont-sur-Oise—my grandfather's home. The classic parks and the countless woodlots throughout the farming country provide further evidence that the Ile-de-France is by nature a land of trees.

Most of the primeval forest, however, was cleared during the early Middle Ages to create farmland, villages, urban settlements and industries. The region now has such a rich agriculture that it has been called

Sheep graze near Mount Hymettus, as important to the landscape as the Greek columns (background).

the granary of France; furthermore, its industrial output is very large and ranges from chemicals to automobiles, airplanes and electronic equipment.

Although I speak of myself as a product of the Ile-de-France, my world until the age of 14 was limited to the part of it which is known as the Vexin, just northwest of Paris between the Seine River and Normandy. I have two dominant memories of my youthful wanderings through this very ancient province of undulating plains and low-lying hills. On the one hand, there were vast fields of wheat, alfalfa and sugar beet, with some pastures and small woodlots; on the other hand, forests and their wide dirt roads with fairly straight long stretches leading on to views of open fields, villages, towns and church steeples. For me this was "nature"—a gentle landscape made up of domesticated fields and readily accessible woodland.

I now realize that the landscapes of my youth were not truly "natural," they had been shaped very differently under other circumstances. For example, medieval peasants, if left to themselves, would certainly have carried deforestation much further to create more farmland. Much of the land, however, belonged to kings and noblemen and they preserved and managed the forests primarily to satisfy their passion for the hunt.

Most of the forest roads where I walked dreamily as a boy, and where lovers look for lilies of the valley in the spring, were opened during medieval and Renais-

Scottish moors were once forests. Ancient oak trees have been dug up in this area near Cleetown.

With some help, the forest reclaims the seaward slope of Mount Hymettus. "Greece does not need archaeologists—she needs arboriculturists."

sance times because they created favorable habitats for game and made hunting easier as well as socially more pleasurable.

The Ile-de-France and the Vexin in particular are adorned with a large number of Romanesque churches. Most have personal histories. During the 12th century, for example, the Countess Agnès de Montfort, Dame de Meulan, vowed to build 17 churches on her Vexin domain if her husband came back safe and sound from a Crusade. He did, and most of the 17 churches that she built in his honor are still in existence. I mention them not so much because of their interest as examples of Romanesque architecture but rather because their story illustrates the kind of social forces which have humanized the landscape all over the world. The effect of such forces is particularly striking in the Ile-de-France because, before historical times, this was a region without any notable characteristics. The hills have such low profiles that they would be of little interest if it were not for the diversified agriculture they now support, and for the venerable churches and clusters of houses which crown their summits. The rivers tend to be sluggish and the ponds muddy, but their shores have been adapted to human use and are associated with peaceful rural scenes. The sky is rarely spectacular but its soft luminosity supports a wide range of plants, many of them introduced by Man. Ever since the primeval forest was first cleared by Neolithic settlers, the Ile-de-France has been acquiring a humanized quality which transcends its natural endowments. To this day, the land has remained fertile, even though it has been in continuous use for more than 2,000 years. Far from being exhausted by intensive agriculture, it still supports a great diversity of human settlements.

What I have just stated about the Ile-de-France is applicable to many other parts of the world. The

Intimacy and elegance in an 18th-century English garden in Wiltshire: Architecture and an artificial lake were added to nature's irregular, curving forms.

prodigious labors of settlers and farmers have generated an astonishing diversity of ecosystems which appear natural even though they are of human origin. The "enclosures" of East Anglia, the *bocages* of French Normandy and Britanny are essentially man-made but their hedges and ditches harbor an immense variety of trees, shrubs and grasses, of insects, fish, rodents and songbirds.

Other kinds of artificial ecosystems have been created in Italy. In Tuscany and Umbria much of the land has been molded by the peasants who have rounded the hills and shaped the slopes to create an architecture of terraces on which they grow crops.

Israel has been growing more desertic since Roman times, but it is once more becoming a land of milk and honey as a result of extensive irrigation and reforestation. South of Esdraelon Valley, the hills were planted during the 1930s with Aleppo pines which are now more than 50 feet high and support a rich flora and fauna. Wild flowers, birds, deer and foxes thus constitute a second nature based on the Aleppo pine which is not native to the region. It is now realized, however, that the exclusive use of these pines is objectionable for both ecological and esthetic reasons. As a result, new plantings in other parts of Israel have a more diversified flora of trees, selected not only for their economic value but also because their shapes are better suited to the landscape. Some sections have been left bare of trees to expose their architectural beauty.

Emigrés and cosmopolitans

The charm of Vermont's Green Mountains is enhanced by the contrast between wooded areas and man-made meadows which occupy many slopes and valleys, let alone village greens. In Europe, even the highest mountains have been humanized. Except for their glaciers, the Alps and Pyrenees have become almost parklike and are crossed throughout with well-marked trails leading to comfortable huts, taverns and hotels. There is still some true wilderness in the United States, but it will be kept in the native state only if the public can be convinced that there are human values in primeval nature—as indeed there are—which transcend the requirements of daily life.

From Japan to Italy, from China to Holland, from Java to Sweden, civilizations have been built on a variety of ecosystems which are almost completely man-made. Everywhere, man has favored sun-loving plants over shade plants, and has moved them from one part of the world to another. There is hardly one agricultural crop and one decorative plant which has not been adapted from its area of origin to another area with compatible soil and climatic conditions. It is because of Man that rice, wheat, the potato, the tomato

and countless other crops have become cosmopolitan; that oranges originating from a Chinese tree are grown on all continents; that wine is produced almost everywhere from European grapes; that Australian eucalyptus trees flourish on the California coast and around the Mediterranean; that African violets now adorn the windows of bourgeois and communist societies alike. In countless places, wilderness has been replaced; it is Man who has created the "nature" in which we spend our daily lives.

To be successful Man's interventions into nature must of course be compatible with ecological laws. But this is more readily said than done and, today as in the past, altering the natural order of things commonly has disastrous consequences. Ecological disasters are particularly threatening in regions of climatic extremes, such as the tropics, where destruction of the soil humus and loss of its mineral nutrients can occur very rapidly under a wide set of agricultural practices. In Panama, soil fertility will have been exhausted within a very few decades if slash-and-burn agriculture continues to spread. Disasters on a colossal scale also threaten in Brazil if developers do not heed the ecological fragility of the Amazon region.

Like the rest of northern Europe, Scandinavia was almost completely wooded at the beginning of the Christian era. It is only during historical times that a large percentage of the coniferous forest has been converted into fields and pastures. The traveler driving or flying from the north towards Stockholm experiences a sense of relief when the monotonous mantle of trees begins to be broken by cultivated areas and smiling meadows. Increasingly, however, the small farms of Sweden are becoming uneconomical and are abandoned. Forest openings which used to support oats, rye or other cultivated crops, as well as grazing cattle, are being taken over by spruce and pine planted in dull straight lines. Worse, the land which is left fallow is quickly invaded by juniper, briar and other unattractive brush.

One problem of Swedish conservation is to find ways for preserving open landscape. Several programs are being tested—subsidies to farmers for the continuation of grazing by cattle and sheep, or mechanical mowing for keeping the brush down. In either case, public funds are being spent to preserve the open countryside which is *a man-made landscape*. Instead of being valued for its agricultural productiveness, farmland is considered an esthetic asset—for a visual quality which used to be hidden under the natural mantle of trees and had to be revealed by human intervention.

When the flow of natural events is undisturbed, it often generates landscapes far exceeding in beauty and in emotional power those created by Man. The eerie light in a primeval forest evokes a mood of wonder which cannot be experienced in a garden or a park. The thunderous silence of the Grand Canyon, the luminosity of the desert, the solitude of the high mountains are among the wilderness experiences which cannot be duplicated artificially and which speak to those aspects of human nature still in resonance with cosmic forces. Thus, certain spontaneous expressions of nature are best left unaltered because they help Man relate to the cosmos in a way that no human creation can ever do.

In our daily life, however, we are more concerned with aspects of nature that we can manipulate. We are hardly ever passive in front of the natural world; we alter it and fence it to create environments that suit our ambitions and limitations. In fact, men have always recognized or imagined patterns in the bewildering opulence of nature—and they have humanized the Earth according to the patterns they perceive.

Early in the Middle Ages, the Benedictine monks believed they were working as partners of God and completing His creation when they transformed the chaotic and disordered wilderness to create environments suitable for their cloistered life. Throughout this essay I have used other words to express a similar faith. I believe that by inserting our dreams and aspirations into ecological determinism, we can enrich the Earth and diversify its manifestations by imposing human order on it and bringing out its hidden potentialities. We can manipulate the raw stuff of nature to shape it into environments which are ecologically sound, economically profitable, esthetically rewarding and favorable to the growth of the human spirit.

A farmer works late in the fields near Chartres cathedral: 2,000 years of "wooing the Earth."

A Nieuport on its nose: U.S. airmen crashed in French planes, died in them, downed 39 Germans and charmed the press. To quote one of them before he died, the Escadrille was not "a complete failure."

By J. Timberlake Gibson

The Escadrille's thrilling era

Who were these airborne American jousters who strutted under Lafayette's banner to fight for France? Here is why they did it.

In the bright days of early August 1914, a group of young Americans in Paris decided to offer their lives to France. Germany had just declared war. Reservists were mobilizing while bands played, flags flew and girls hung garlands on the guns that rumbled through the city.

The American zealots joined the Foreign Legion, marched on bleeding feet, dug ditches, hauled dirt, mucked latrines, dined on thin soup and slept on lice-infested straw. And it soon became apparent that all this was not what they had had in mind when they enlisted. Their crusade, they decided, could be better won in the glorious air, fighting plane for plane, man for man, like knights of yore.

Within a few months, a handful of these Americans managed to transfer to the *Service Aéronautique* for pilot training. Other Americans transferred from the American Ambulance Corps. Gradually the idea of an American squadron was born and nurtured into reality by dint of enthusiasm mixed with copious amounts of influence. The would-be heroes had plenty of the former and, since some of them were young Ivy Leaguers, there was considerable influence available, too. The William K. Vanderbilts anted up some thousands of dollars to help finance the proposed squadron and give it a little tone—for example, a mess that resembled the Ritz cuisine, at least to any passing one-cent *poilu* who wandered close enough to get a whiff.

On April 20, 1916, the *Escadrille Américaine* was created with an urbane Parisian and St. Cyr graduate in command—Captain Georges Thenault. In December, the name was changed to Lafayette Escadrille in deference to neutrality cranks (and the Germans) who insisted that *Américaine* was too compromising.

Who were the men who formed it and flocked to its ranks out of an idealism that seems so archaic to many of their grandchildren today?

William Thaw II was the son of an enormously wealthy Pittsburgh railroad director and the half-nephew of Harry K. Thaw. In 1906, Uncle Harry had shot architect Stanford White in a jealous snit over showgirl Evelyn Nesbit.

Bill Thaw's background was what F. Scott Fitzgerald would later write about so reverently: He was equally at ease in Palm Beach, Newport, New York and (fortunately for the Escadrille) Paris. He was built like an athlete and sported a luxuriant moustache which drooped or turned up according to the effort spent on it. He used to fly over the Long Island countryside in his Curtiss pusher, an early plane where the pilot sat out in the breeze amid a tangle of spars and wires.

Devastatingly attractive to women, Thaw was the man who had everything—except a cause to justify what he considered a vapid existence. Thus he was one of the first Americans to join the Legion, transfer to the air service and help found the Escadrille.

Sharing credit for the birth of the Escadrille was Norman Prince of Pride's Crossing, Massachusetts, vigorous and adventurous son of a rich family. Like

Whiskey, the Escadrille's mascot, found Raoul Lufbery, the squadron's ace, less than forbidding.

Mr. Gibson, contributing editor to Washingtonian, *has written for* Sports Illustrated *and* Holiday.

Thaw, Prince was already a pilot. His family kept a house at Pau, one of the main French flight-training centers, and Prince understood the French. He had a Harvard law degree and was a persuasive arguer—persistent enough to crack through French bureaucracy.

Prince was killed in the line of duty in 1916, and his sarcophagus in the Washington Cathedral bears a simple phrase: ". . . among the first to lead where the nation followed in the World War."

Among those that followed were Kiffin and Paul Rockwell, born in Newport, Tennessee. Aristocratic, steeped in the Southern mystique, they said good-bye to Atlanta's Peachtree Street and sailed for France. In the best posture of F. Scott Fitzgerald, Kiffin told his mother, "If I should be killed in this war I will at least die as a man should and would not consider myself a complete failure. . . . I think if anything will make a man of me, it is this giving as a volunteer one's best for an ideal." Of course at 22, death is as incomprehensible as rheumatism.

Mourned like Hector

Kiffin Rockwell had offered his services to France on August 3, 1914, and was possibly the first American to do so. He was the first Lafayette Escadrille pilot to down an enemy plane and the first American in the Escadrille to earn the *Médaille Militaire.* And Kiffin Rockwell, youthful American, was one of the Escadrille's first casualties. On September 23, 1916, he was killed—a starry-eyed idealist shattered by an illegal dumdum bullet. He was mourned like Hector.

Kiffin's brother, Paul, received a disabling wound before he could get involved in the deadly business of flying, spent the war as a correspondent and became the official historian of the Lafayette Escadrille.

Thaw, Prince and the Rockwells were from the same world. Not so Weston Bert Hall, adventurer, yarn spinner and soldier of fortune. He claimed to have been a racing driver, also an aviator in the Balkan Wars of 1912, in which, he said, he flew against the Bulgarians for a sultan of Turkey. He then, so it seems, was moved by the plight of gallant France and rushed to her aid.

Some called him the biggest liar in the Foreign Legion, surely a monumental reputation for any man to achieve. His first social upgrading came with his enlistment in the French *Service Aéronautique* in December 1914, along with Thaw and James Bach, another young enthusiast who spent the war as a German prisoner. But Hall's debut as an aviator left something to be desired. He wrecked his Blériot trainer right on the ground, and it became readily apparent that he had never been aloft. However, the French officer in charge was so impressed with such cheek that off to Pau went Hall to train. In barracks he began to noise about his exploits in the Balkans and in lesser areas. Soon the French began to regard him as some sort of spy, but several weeks of close surveillance failed to turn up anything more substantial than hot air.

The reporters of the American press, however, slumped around the Ritz bar in Paris, eventually adopted Bert as their darling. They listened eagerly to his accounts of aerial dogfights and Zepellin downings *ad nauseum,* for they were anxiously dependent on any handout, however improbable. During the Kiffin Rockwell funeral, Hall was in Paris to sell an "eyewitness" account of Rockwell's death (with many an embellishment) to the financially grateful American press. This, added to the fact that he generally violated the code of a gentleman—he cheated at cards and would have thought that *noblesse oblige* was a horse running at Longchamps—led to his dismissal from the tight little group.

The others went to him and asked him to leave, which he did, with imprecations. He returned to the States and became the world's greatest authority on aerial warfare, titillating vaudeville audiences with his usual mixture of half-truth and outright whopper. One comrade-in-arms recalled that "he had a mouth like a running sore," but he must have had a certain charm since, he confided, his nattily tailored uniforms were supplied to him by his lady friends.

Hall claimed several birthplaces and even when he died in 1948 there was confusion as to what happened: a heart attack, said one paper; an automobile accident, said another.

Norman Prince

William Thaw II

Yet another member with a background as un-Fitzgeraldian as Bert Hall's, was idolized in the Escadrille. Raoul Lufbery had lived all over the world by his wits. A stocky, muscular man, he had seemed inept during flight training but by diligence he became a master of acrobatic flight and developed the Lufbery Circle. He had one quality that set him apart from his young colleagues—his motivation was neither idealism, love of adventure nor personal gain. It was a powerful desire for revenge.

A close friend—a French pilot—was killed early in the war and Lufbery kept alive a simmering rage at the enemy, marked by a personal ambition to do in the Kaiser himself.

Lufbery accounted for 17 Germans, officially, and at least an equal number not counted because Allied observers didn't see them. On May 19, 1918, he jumped to his death from a flaming airplane.

This sort of ending awaited others. There was Victor Emmanuel Chapman, Harvard graduate and great-great grandson of Chief Justice John Jay, who complained of the hyperbole of the press: "I am reported killed twice already. . . ." Alas, the third report was accurate. This reckless, handsome and generous youth met his death outnumbered by Fokkers.

There was gallant and likeable James Rogers McConnell, graduate of the University of Virginia. His statue stands on the grounds there now, a matter of little curiosity to passersby, though he, too, died like a hero just before the United States entered the war. He left a letter which ended: "God damn Germany and Vive la France." As easy as that—the enemy was wicked, the cause was just. So kill the bastards and make the world safe.

Harold Buckley Willis, another Harvard graduate, was captured by the enemy and made a successful break from prison camp on October 13, 1918. By the time he reached Switzerland, the war was virtually over. Thomas M. Hewitt jr. cracked up two SPADS in as many days to the tune of $20,485.22—about what a landing gear on an F-4 Phantom would cost today. John Armstrong Drexel came in on May 10, 1917, and lasted about a month. Where Bert Hall couldn't rise to the Escadrille's aristocratic outlook, Drexel couldn't "democratize" down to it.

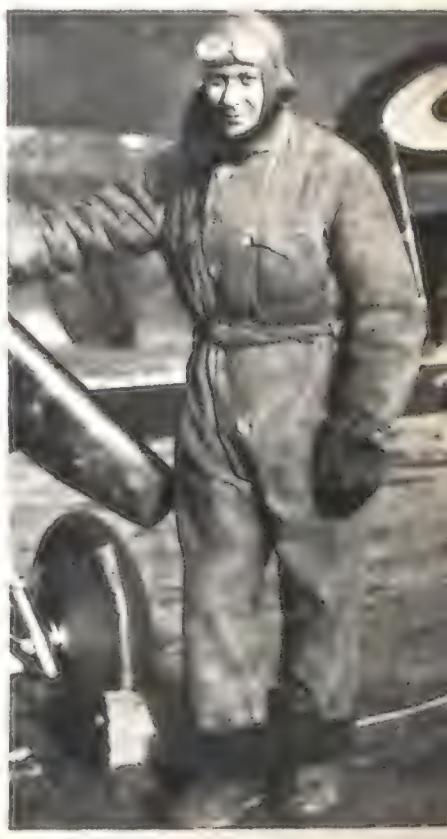
Another late member, and a great asset, was the other Hall—James Norman. After his discharge from the British Army in 1915, he hoped to reenlist and write a series of articles for the *Atlantic Monthly*, including a coverage of the Escadrille. Hall was so overpowered by the combination of Thaw, Lufbery, Rockwell and McConnell that he decided any berth short of the Escadrille would be anticlimactic. He enlisted in the French *Service Aéronautique*, hoping for a transfer to the Escadrille, and he finally got it. On May 7, 1918, Hall was shot down behind enemy lines and saw the rest of the war out as a prisoner, undoubtedly conceiving ideas for books such as *Falcons of France* and *The Lafayette Flying Corps*, written in collaboration with Charles Nordhoff, an aviator from Los Angeles. After his discharge in 1919, Hall went to Tahiti with Nordhoff and they collaborated on the famed *Mutiny on the Bounty*. Hall died there in 1951.

Every narrative of the Escadrille must include Ed-

Harold Willis

Kiffin Rockwell

Raoul Lufbery



James McConnell

win C. Parsons of Holyoke, Massachusetts, a graduate of the University of Pennsylvania. His gung-ho book *I Flew with the Lafayette Escadrille* has a certain on-the-spot vitality, unhampered by literary pretensions. He seems to have seen no evil in his former buddies, so we read much about their happy drinking bouts, but little about the death of Douglas MacMonagle who, in punishment for insubordination, was ordered aloft too soon after a giant spree.

Parsons remained with the *Service Aéronautique* when the old squadron was dissolved, and he was credited with eight victories during the war (it takes five to become an "ace").

The press made all these young men into caricatures of Frank Merriwell. Benjamin Stuart Walcott, son of Dr. Charles D. Walcott, Secretary of the Smithsonian Institution, paints a more realistic picture of knights who were only men. After he was exposed to the shenanigans of the Escadrille, young Walcott wrote: "They are a very odd crowd—the members of the Lafayette Escadrille—a few nice ones and a bunch of rather roughnecks. Their conversation is an eyeopener for a new arrival. Mostly about Paris, permissions, and the *rue de Braye,* but occasionally about work and that *is* interesting. Nonchalant doesn't express it."

Walcott's touching letters appeared in *National Geographic* in 1918—a month after he too died in his first combat.

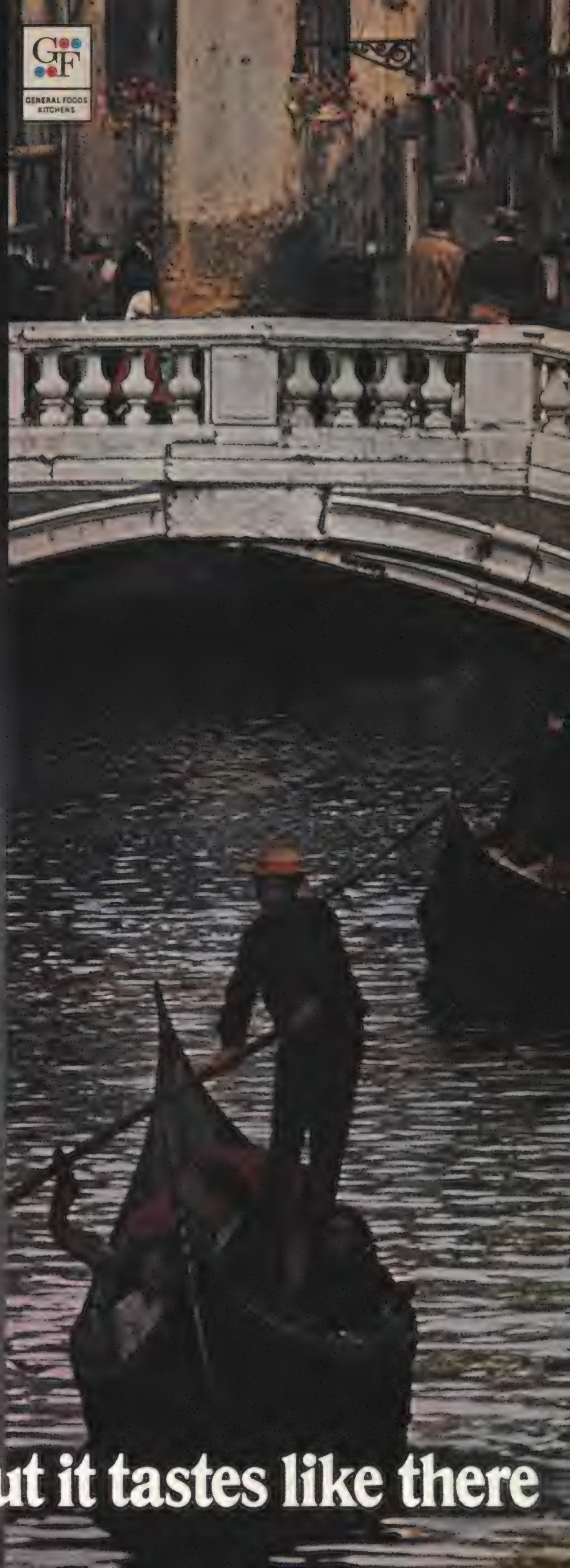
The roster goes on: Cowdin, Balsley, Johnson, Rumsey, Hill, Masson, Pavelka, Robert Rockwell, Frederick Prince, Soubiran, Haviland, Hoskier, Genêt, Bigelow . . . Some mementoes—helmets, medals, an Indian head insignia, a black tunic, a group of portraits—are displayed at the Smithsonian Institution . . . Hinkle, Lovell, Marr, Dugan, Campbell, Bridgman, Jones, Dolan, Peterson, Ford and James R. Doolittle. Out of the 38 American members, ten were killed in the war.

The Escadrille downed only 39 planes—the Red Baron alone accounted for 80—so they could not be credited with winning the war. What did they accomplish aside from strutting in their customized uniforms, keeping lion cubs as pets and dining on cordon bleu fare? The answer may seem strangely dated today: These young men displayed a spectacular willingness to die for a cause.

Prince's funeral: Having died from injuries suffered in a crash, a squadron co-founder,

Norman Prince, wearing the Legion of Honor medal, was brought to Luxeuil for a hero's rites.

Birds Eye® Italian Style Vegetables. Taste our beans, chick peas, red peppers, black olives, onions and a sauce your husband will think is molto magnifico. Close your eyes. Take a bite. And even though we make it over here in America, you'll think you're eating in a ristorante in Venice. Birds Eye® International Vegetables also come in other styles. Hawaiian, Danish, Parisian, Bavarian, Chinese, Spanish, Mexican and Japanese.



We make it here but it tastes like there

At the front in 'the war to end all wars'

On November 9, 1918, just two days before Armistice, Lieutenant Heinz Von Beaulieu-Marconnay startled everyone by setting his plane down, unharmed, on the forward American airstrip near Verdun. Today his Fokker stands on the dirt floor of the Smithsonian's World War I fighters exhibit while, from a back room in the bombed-out French barracks unit (left), visitors can eavesdrop on Americans interrogating the German pilot. Every few minutes they, and the boom of distant artillery, are drowned in the roar of two SPADS overhead, one of them hung in a jubilant victory roll and the other tipping its wings as it buzzes the field.

From elsewhere in the hall, around to the right of the gun emplacement, where reminders of the Lafayette Escadrille as well as other memorabilia of the air war are displayed, one can hear a bugle and make out the cheerful, tinny song of the folks back home: "Over there, over there . . ."

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Photographed by J R Eyerman, the aurora borealis illuminates the night sky over western Canada.

By Ben Bova

Physicists probe the ultimate source of energy

With knowledge of ionized gases, sophisticated engineering and money, we might end up with a virtually inexhaustible supply of power

Man is a technological animal. From earliest times until the very recent past, all he asked of technology was that it satisfy the basic needs of survival: food, shelter, warmth. This first-generation technology succeeded admirably well. With its aid, humankind survived the Ice Ages, developed agriculture, built cities, and became the dominant species of life on Earth.

Now we find that our first-generation technology has succeeded too well. In addition to providing jobs, profits and products, it has produced an appalling burden of pollution, helped create a population explosion and threatens to exhaust the Earth's limited store of natural resources.

We can neither turn our back on technology, returning to some simpler, carefree life, nor can we expect technology to cure all our ills—but it can help. What's needed is a new kind of technology, one might call it a *second-generation* technology, that can provide

There, in the ionosphere, some 50,000 feet up, the world of plasma (or ionized gas) begins.

Sometimes called the "fourth state of matter," plasma is the predominant stuff of the universe.

all our survival needs—including the desperate need for living in harmony with the environment. For example, a second-generation technology should provide power with a bare minimum of pollution.

We will concentrate on this question of power—or energy production—because this is the central issue in every technological era. Ever since *Homo erectus* discovered the uses of fire, some half-million years ago, the advance of Man's society has been inextricably bound up with the advance of his abilities to generate and use energy.

Today we are entering what many people call an "energy crisis." There may not be enough electrical energy to keep all the looms spinning and, in the short run, no technology available to us is free of unhappy side effects. The second-generation technology we need for the future is, however, in sight. One important aspect of this new technology is the rather young science of plasma physics. Plasma is the fourth state of matter, different from solids, liquids and gases.

A plasma looks superficially like a gas, and in many ways behaves like a gas. But there is one major difference. In a gas, the atoms are intact and electrically neutral. For every positively charged proton in an atom's nucleus, there's a negatively charged electron orbiting around that nucleus. But a plasma is an *ionized* gas. Some of the atoms have had one or more electrons ripped away. Thus a plasma is a mixture of ordinary neutral atoms, ions (atoms that have lost electrons) and free electrons.

For every positively charged ion, there's a free electron in the plasma with a negative charge. Thus, as a whole, the plasma is electrically neutral. But those loose electrons are free to carry electrical currents. This is the major difference between a gas and a plasma: A plasma can rather easily conduct electricity;

a gas cannot. That doesn't look like much of a difference, at first glance, but on such a seemingly slight difference tomorrow's technology will probably be built.

For the earthbound, most plasmas are man-made. The gas in a fluorescent lamp becomes ionized when an electrical current is forced through it, so the lamp's glow comes from plasma energy. The exhaust of a rocket engine is a very weakly ionized plasma. The fireball of a nuclear explosion is a fully ionized plasma for a brief moment of terror.

But just about 50 miles or so over our heads, the natural world of plasma begins. The upper layers of the air, called the ionosphere, are plasma. This is where the aurora borealis (pp. 38-39) occurs. The sun is plasma and so are all the stars. Much of the glowing interstellar nebulas are plasma clouds. In fact, almost all the universe is plasma.

Plasmas can be manipulated by electromagnetic forces and, under the proper circumstances, the vast energies locked inside them can be tapped to produce electrical power. Plasma physics offers at least two exciting ways of producing electricity with very little pollution and greater efficiency than present electrical power generators.

The first of these methods goes by the jawbreaking title of *magnetohydrodynamics*. Call it MHD. As the term is now used by physicists and engineers, MHD means the interaction of a moving plasma with a magnetic field.

Michael Faraday (1791-1867) discovered the basic principles of electrical power generation almost a century and a half ago. He found that when a material that conducts electricity is set in motion through a magnetic field, an electric current is generated. In 1882, Thomas Edison (1847-1931) turned Faraday's laboratory curiosity into an industry. Edison's generators (then called dynamos) had a bundle of copper wires, called an *armature,* spinning rapidly in a magnetic field, thereby generating an electric current.

After nearly a century of development, modern power generators still use the same principle. They convert heat into mechanical and then electrical energy (see drawing).

An MHD generator skips one step. Visualize the exhaust of a rocket engine firing through a powerful magnetic field. The entire mechanical system of turbines and armatures that conventional generators need is eliminated. The MHD generator is a *direct conversion* device: It converts heat energy directly into electricity.

In principle, the MHD generator is quite simple. There are no moving parts. Only the plasma moves, at supersonic speed. The MHD generator is basically a pipe (called a channel) surrounded by a magnet. At one end of the channel is a heat source. At the other is an exhaust system. Electrodes inside the channel tap off the current that is being produced in the plasma.

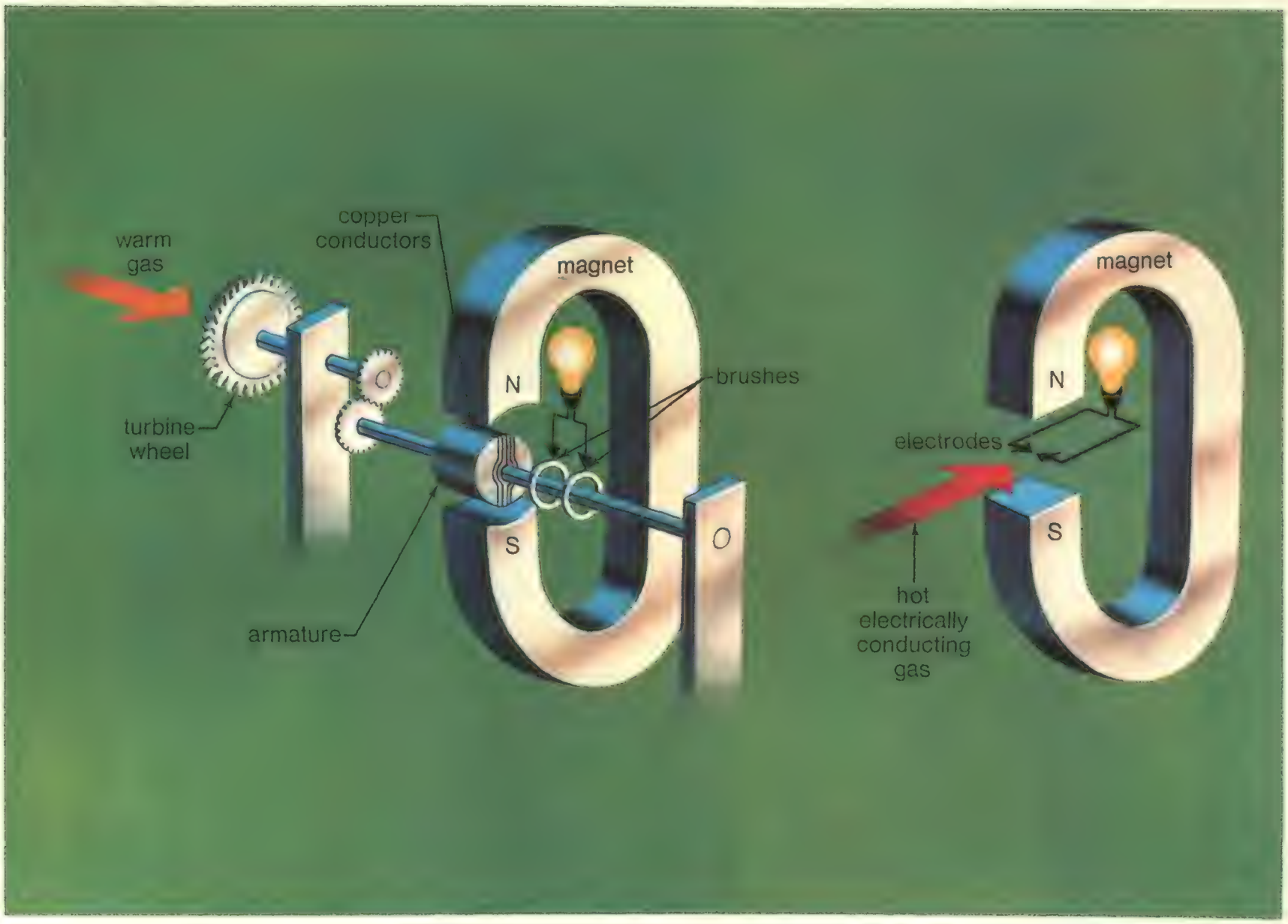
The two tremendous advantages of MHD are high efficiency and low pollution. The best modern turbogenerator power plants are about 40 percent efficient. Nuclear power plants are less. The first MHD power plants will be between 50 and 60 percent efficient; later developments should improve that percentage.

The main advantage is the MHD generator's thermal efficiency. All generators are essentially heat engines, and the amount of energy you can extract from them is directly dependent on the temperature difference between the hottest and coldest ends of the cycle. In engineering terms, this means it is desirable to operate with as high a peak temperature as possible.

To begin with, MHD generators operate at temperatures of about 3000 degrees Kelvin—more than twice as high as turbines. Furthermore, when the plasma comes out of the MHD channel, it is still quite hot and carries a considerable amount of energy. Taking advantage of this, MHD power plant designs call for using this hot plasma stream either to make steam for a conventional set of steam turbogenerators or, after some cooling, to be used directly on gas turbines, which are similar to the jet engines that aircraft use. The idea is to squeeze all the energy possible out of the system. This is how the increased efficiency of the MHD system is obtained by adding the MHD generator as a "topping" cycle to a regular turbine plant.

Since it will use more of its heat for energy production, it will need less cooling water, megawatt for megawatt. Furthermore, an MHD generator can be teamed with gas-turbine generators, instead of steam

Ben Bova is a widely known writer on science and science fiction. He is a consultant to industry and editor of Analog *magazine.*



In a conventional generator (left), gas such as steam drives turbine which spins copper conductor in magnetic field, thereby generating current.

In a magnetohydrodynamic generator (at right), electrically conducting plasma flows through a magnetic field, producing electricity in fewer steps.

generators (it is the water used for steam that creates most of the thermal pollution problem). In a gas-turbine system there would be no hot water problem at all. In areas of the American West, where coal is abundant but water is scarce, such "dry" MHD systems have attracted considerable interest.

As for air pollution, the MHD generator is so bad that it is good. The MHD process produces such high quantities of certain pollutants that it becomes economically attractive to separate them from the exhaust by conventional chemical methods for reuse.

To date, MHD generators are still experimental machines. The highest power output achieved so far has been nearly 35 megawatts, from a generator built by Avco Everett Research Laboratory in Massachusetts. The world's first MHD steam-power plant—still experimental—has been built by the Institute of High Temperatures, the USSR Academy of Sciences. This prototypic power plant will deliver 75 megawatts: 25 from its MHD generator and the remainder from a conventional steam turbogenerator set. In this country, the Department of the Interior recently began funding MHD development through its Office of Coal Research, since MHD might help open up new coal resources now considered uneconomic.

The "energy crisis," however, is more than local shortages of electricity over the next decades. It is the ultimate and foreseeable exhaustion of Earth's fuel resources. An answer to this problem, based on plasma physics, is on the way; thermonuclear fusion, or more simply, the controlled thermonuclear reactor—CTR.

Fusion energy is what powers the stars. It is the basic—perhaps the ultimate—energy source of the universe. Scientists are tremblingly close to producing controlled fusion reactions in their laboratories.

Although fusion energy comes from the heart of the atomic nucleus, it is very different from the fission type of nuclear energy that is already being used to generate electricity. In fission, heavy atoms such as uranium or thorium are split apart, releasing energy.

An ultimate energy source

In fusion, light atoms such as the various isotopes of hydrogen are forced together—fused—to create energy.

At the sun's core, the plasma is completely ionized and has a temperature in excess of 15 million degrees K. With the sun's weight (some 330,000 times more than the mass of our not-insubstantial Earth) pressing down on the core, the pressure is something like 450 *billion* times Earth's sea-level atmospheric pressure.

Under these extreme conditions, complex reactions take place, including the fusion of hydrogen ions, which produce helium nuclei and the energy that we see as sunshine. The hydrogen ions are nothing more than single protons, positively charged basic atomic particles. Since they are all positively charged (and like charges repel) tremendous energy must be imparted to the protons before they overcome their electrostatic repulsion and fuse together.

The sun achieves fusion by brute force and huge mass. Terrestrial physicists must work with grams of material, not billions of tons. They must use higher temperatures so that they can do with much lower pressure and they have had to turn to different fusion reactions, involving the heavier isotopes of hydrogen: deuterium and tritium. Both these isotopes are chemically similar to ordinary hydrogen. But where ordinary hydrogen has only a single proton for a nucleus, deuterium has a proton and neutron, and tritium has a proton and two neutrons.

Deuterium is found naturally in seawater. For every 6,000-odd atoms of ordinary hydrogen in the oceans, there is one atom of deuterium. Water formed with deuterium is what physicists call "heavy water"; the neutron in the deuterium's nucleus makes it twice as heavy as ordinary hydrogen. Tritium is practically nonexistent in the natural world (on this planet) and is usually created in the laboratory.

Deuterium can be taken from seawater and separated from ordinary hydrogen rather simply. There is enough deuterium in a cubic meter of seawater (about 264.2 gallons) to yield more than *400,000 kilowatt hours of energy*. There is enough deuterium in the oceans to supply hundreds of times the amount of energy the world now uses, for millions of years into the future—if we can build a practical CTR.

The fusion reaction was discovered in 1932 but scientists have been working on the fusion power concept only since the 1950s. Spurred in part by the development of the H-bomb (which is an uncontrolled fusion reaction), research on CTRs accelerated in many nations. In 1958, at the Second U.N. International Conference on the Peaceful Uses of Atomic Energy, all research on fusion was brought out into the open. Since then, the world's scientists—on both sides of the Iron Curtain—have worked together in this vastly important research program.

The CTR that physicists are now trying to build will work this way: Two deuterons (deuterium nuclei) can interact with each other in two equally likely ways. They will form the nucleus of a light isotope of helium, helium-3, and a free neutron (see illustration on page 41). Or they will combine to form a tritium nucleus, called a triton, plus a free proton. More deuterons will then react with both the tritons and the helium-3 nuclei to form "ordinary" helium-4 plus free protons and neutrons, plus energy.

Stringent requirements

To achieve this happy state, though, there are three requirements: (1) The minimum temperature for a fusion reaction is 46 million degrees K. (2) The density of the plasma must be at least 10^{15} ions per cubic centimeter (roughly 10,000 times less dense than sea level air). (3) The plasma must be kept at this temperature and density for about a tenth of a second. This is called *confinement*. Some combination of these three requirements must be met before a deuterium plasma will "trigger" and then begin to produce *self-sustaining* fusion reactions.

The problem is similar to starting your automobile engine on a cold day. Once you get it started, it will run as long as you feed fuel into it. But getting it started is the problem. The key to controlled fusion is the task of plasma confinement—holding the plasma at the necessary temperature and density long enough to get the first fusion reactions going.

Whatever it is that confines a plasma, it cannot be a solid wall because such contact would immediately cool the plasma and end the fusion experiment.

So the plasma is contained in a magnetic bottle: Strong magnetic fields suspend the plasma inside a vacuum chamber and prevent the plasma from touch-

To bottle up the elusive plasma needed to create a controlled thermonuclear reaction, scientists in California are trying this large electromagnet, called "Baseball"; it resembles a baseball's stitching.

ing the walls. The names of the experimental fusion reactors are either dramatic or whimsical—Perhapsatron, Stellarator, Phoenix, Baseball. So far, the plasmas inside these machines have leaked through the magnetic fields that are supposed to confine them. The physicists have watched in frustrated awe as one form of instability after another has manifested itself, watched and learned.

Most of the major sources of these plasma instabilities have been found and conquered. A few minor instability problems remain, subtler and perhaps harder to cure than the others. But a type of Russian fusion device called *Tokomak* has come so close to producing the necessary conditions of temperature, density and confinement time that most of the world's fusion laboratories have switched over to Tokomak-type machines.

Meanwhile, there is increasing excitement over the possibility of avoiding the confinement problem altogether. The idea is to use a pellet of solid deuterium, rather than a gas. A very high-powered laser "zaps" the deuterium pellet into a plasma of the right temperature and density for fusion reactions to take place. A pulse of energy is emitted from the plasma, which expands, cools off, and is vented out of the reaction chamber. A new pellet of deuterium comes in, the laser "zaps" again, and a new pulse of energy is created. There is no need to contain the plasma at all in this type of pulsed fusion reactor.

Lasers with sufficient energy to do this job are now being developed, and the optimists among the fusion researchers believe that by the 1980s either the Tokomak type of sustained CTR or the laser-pulsed reactor will have worked successfully.

By the end of this century, practical CTR power plants may well be a reality. Drawing their basic fuel from water, they will be safe and relatively pollution free. There is not enough deuterium in the CTR at any time to cause the mildest threat of an explosion.

Using the valuable protons

The fusion reactions *do* produce very energetic neutrons, which could cause radiation problems if they were passed outside the reactor. But these neutrons are far too valuable to be allowed to escape and cause harm. Their energy can be used to cause nuclear transformations, transmitting atoms of one element or isotope into atoms of another. For example, the neutrons can convert the atoms of a light element such as lithium into tritium, so that more tritons will be available as fuel for the CTR.

More important, perhaps, is the relatively new concept of using the neutrons to convert the radioactive wastes from fission power plants into nonradioactive elements, which can then be disposed of safely.

The CTR power plant may also prove to be the ultimate recycling machine—a fusion torch. The energy of the fusion plasma can be used to totally vaporize any material we wish to recycle. An automobile, for example, can be reduced to a cloud of gas or plasma consisting of pure elements: pure iron, pure carbon, pure copper, pure chromium, and so forth. While still in the gas phase, these elements can be separated from one another by conventional equipment now in existence, and then recycled.

While the physicists are getting close to triggering a sustained fusion reaction in the laboratory, the engineers are just beginning to look into the problems of converting the star-energy of fusion into useful forms of power, such as electricity.

The most obvious—and least exciting—technique is to go back to turbogenerators again. In this concept,

the energy from the fusion plasma would vaporize a metal such as potassium. The potassium vapor would drive one set of turbines, and its leftover heat would be used to make (you may have guessed it) steam for conventional steam turbogenerators. While this isn't terribly innovative, it does promise to produce a power plant that is about 50 percent efficient, nonpolluting and running on water.

More exciting ideas are coming to the fore, though, including the possibility of tapping the fusion plasma directly and converting its stream of enormously energetic ions and electrons in somewhat the same manner that an MHD generator works.

When it comes, fusion will certainly be the biggest bargain in Man's history since the discovery of fire. To date, since World War II, the United States has spent about $400 million on fusion research. The fiscal year 1973 budget for fusion is $38 million, up from the previous year's $31 million. The Soviet Union spends about twice that amount annually.

We have spent, over the last quarter-century, less on fusion research than a year's budget of spare parts for a tactical missile. Would fusion come faster if we spent more? Perhaps not. There are various opinions inside and outside the laboratories. But after the first sustained fusion reaction is achieved, the "ante" for CTRs will go up steeply. Research is relatively cheap; developing practical hardware takes much more money. Whatever it takes, it will have been worth it.

Starting the game of fusion

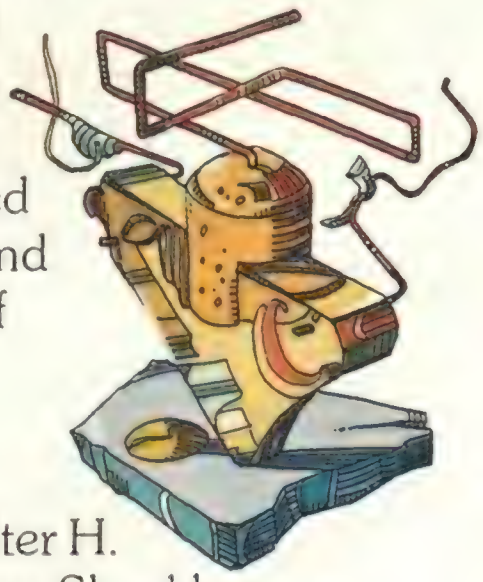
Central to the game of fusion, as physicists are currently trying to play it, is a number of alternative atomic reactions. One such reaction has been diagrammed on the pool table to the right and photographed by Charles Phillips.

The player starts with two deuterons at the far end of the table (a fusion reactor). A deuteron is the nucleus of deuterium, sometimes called heavy water, and it consists of one proton (white ball) and one neutron (red ball). Under the proper circumstances, the two deuterons will meet and fuse, as is happening at the table's center. This in turn results in one helium nucleus at lower right (two white protons and one red neutron), one free neutron (the red ball on the lip of the pocket at lower left) which escapes from the reactor, and 3.2 million electron volts of energy.

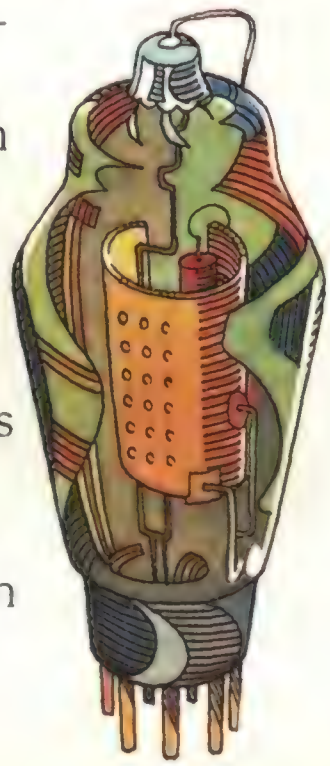
The real trick in this game, of course, is to produce not just one such reaction, which is as far as this photograph goes, but a controlled self-sustaining web of fusion reactions. This is a task which physicists have yet to finish.

Since Bell Labs invented the transistor,

On December 23, 1947, a team of Bell Laboratories scientists demonstrated that they could manipulate the behavior of electrons in a crystal of germanium and thereby amplify an electric current and the sound of a voice being carried by the current. This invention, the transistor, revolutionized communications and affected the lives of just about everybody in the world. For their work, John Bardeen, Walter H. Brattain, and William Shockley received a Nobel Prize.

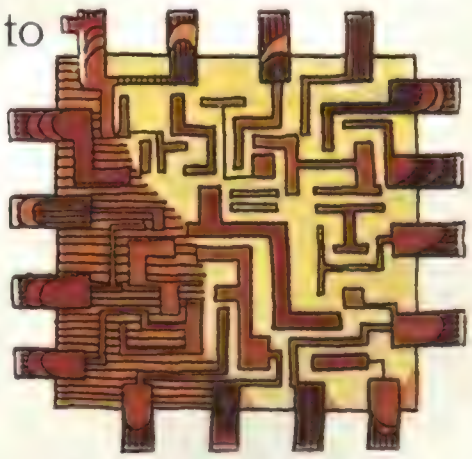


The story of the transistor began in the late 1930s. Telephone equipment used vast numbers of vacuum tubes and relays, but seemed to have inherent limitations for handling the ever-growing, ever more complex communications needs of the future. Devices without the shortcomings of tubes and relays were needed. Bell Labs scientists sought to find the answer through research in semiconductor materials. World War II interrupted their efforts until 1945 when the quest was resumed. Out of this research came the discovery of the transistor effect—the amplification and control of the flow of electrons in a solid material.



Bell Labs immediately mounted a major effort to understand fully the new phenomenon, devise new transistor structures, and develop methods for preparing and purifying germanium, and later silicon. The early "point-contact" transistor was soon followed by the "grown-junction," the "diffused-base," and the "field-effect" designs, and more recently by the combining of large numbers of transistors, diodes, and resistors on a single chip of silicon to form the "integrated circuit."

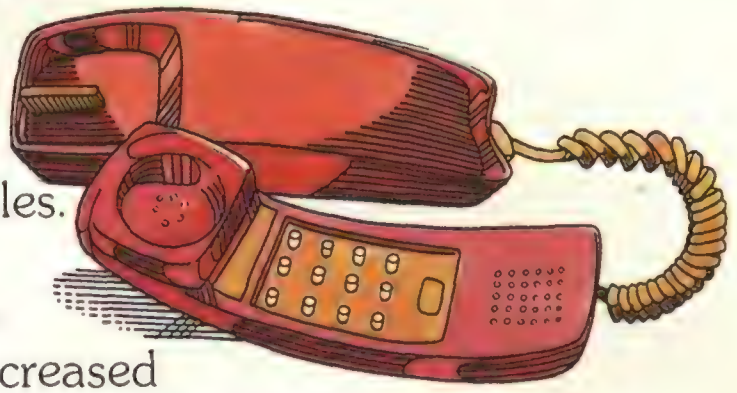
Western Electric in turn set out to apply its broad manufacturing expertise to producing economically the large numbers of transistors needed for telephone uses. Methods were required to refine semiconductor materials to extreme levels of purity, to grow perfect single crystals out of them, to diffuse appropriate "impurity" atoms into the semiconductor for altering its properties, to form individual devices, and to encapsulate them. Western Electric had to design and build factories where this work is done under microscopes in hospital-clean, dust-free environments.



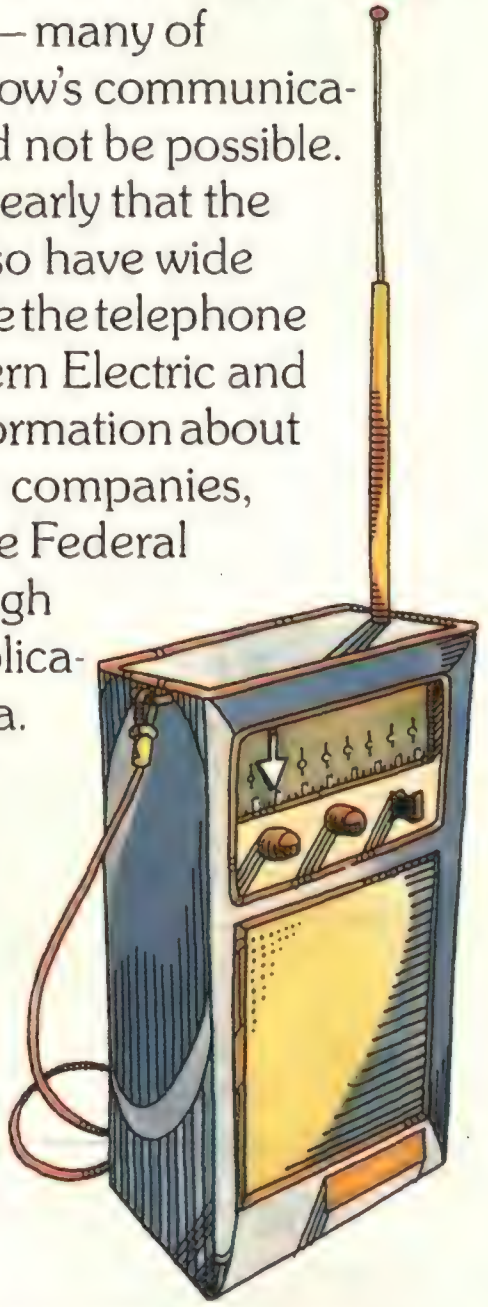
In the Bell System, transistors and other semiconductor devices have made possible Touch-Tone® dialing,

your world has never been the same.

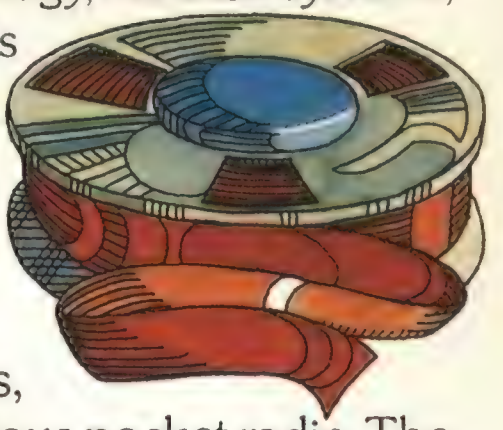
high-speed data transmission, and highly reliable undersea cables. These devices have increased enormously the capacities and dependability of buried coaxial cables for carrying communications across the country. They have also made possible new switching machines for rapidly connecting telephone callers and providing such new services as automatic call transfer. Without the transistor—and its minute size, heat-free operation, and high reliability—many of today's and tomorrow's communications services would not be possible.



It was evident early that the transistor would also have wide applications outside the telephone business. So, Western Electric and Bell Labs made information about it available to other companies, universities, and the Federal Government through technical talks, publications, and symposia. As a result, a large effort in research, development, and manufacture of transistors soon got going outside the Bell System.



Today, transistors are widely used in space exploration, satellite communications, medical technology, defense systems, and in hundreds of such diverse products as television sets, hearing aids, automobile ignition systems, and the ubiquitous pocket radio. The transistor revolutionized the computer industry by making possible millions of accurate calculations in less than a second.



The transistor spawned a whole new industry of "solid-state electronics." Worldwide sales of semiconductor devices are estimated to add up to $2.7 billion this year. In the USA, nearly 8 million people are employed in the manufacture of equipment using these devices.

All this started 25 years ago. The same philosophy of technical innovation that created and made practical the transistor continues to operate today in Bell Labs and Western Electric. They are working together to bring you better communications services at lower cost through your local Bell operating company. At the same time, spin-offs from their creativity are benefiting all mankind.

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Three fierce-looking golden lion marmosets peer from a tree in Monkey Jungle in Florida.

By John Perry

In danger—golden lion marmosets

Conservationists swing into action in hopes of making these small creatures more than a symbol of Brazil's environmental woes

Brazil's golden lion marmoset might have vanished from the Earth before most conservationists even knew it was in danger. As recently as 1968, it appeared on no official lists of endangered species, yet only a few hundred remained and this number was fast declining.

The remnant population lived in coastal forest not far from Rio de Janeiro and, though few Brazilians had ever seen one there, animal trappers collected them for foreign zoos and the pet trade.

With their tiny, fierce faces, red-gold pelage, lion manes and lively behavior, they make fine zoo exhibits. Less than 100 were scattered through the world's zoos, however, because they are delicate and difficult to keep. Many died in transit, others soon after arrival. Several zoo groups were wiped out by disease and some were killed in fights with cage mates.

Golden lion marmoset

One of a small colony of golden lion marmosets climbs about in a simulated jungle.

In captivity, their vivid red-gold coats often faded to a creamy yellow. While some young were born, infant mortality was high, commonly from rickets.

At least one man, Dr. Adelmar F. Coimbra-Filho, was concerned. Then on the staff of the Rio de Janeiro zoo, he had kept several dozen assorted marmosets in his care and spent days sitting quietly in the gallery forest around the São João River, patiently waiting for glimpses of gold in the sun-dappled green canopy.

In October 1968, Coimbra was among the first to speak at an international symposium on Brazilian conservation. His case was compelling. The original habitat of this small creature was some 10,000 square kilometers of almost unbroken forest. This section of the coast was attractive to early settlers. Rio de Janeiro and its satellite communities preempted portions of the marmoset's range. Much more had been cleared for farming, cattle grazing and other human purposes. Coimbra's map showed only a few remaining bits of forest land, all in private ownership.

Coimbra reported that no more than 600 golden lion marmosets survived in 900 square kilometers of forest remnants. Most of them were clustered in the lower portion of the São João River basin. He proposed that a preserve be established there. If further deforestation and trapping were halted, the species might survive.

Other speakers at the symposium described Brazil's larger conservation problems, but Coimbra's marmosets captured the most attention. It was a simple, clear case: problem, cause, possible solution. The golden lion marmoset was attractive, a natural symbol, and Coimbra's alarm signal was heard over the world. The golden lion marmoset *(Leontopithecus rosalia)* was added to the *Red Data Book,* the authoritative guide to the world's endangered species issued by the International Union for the Conservation of Nature (IUCN). IUCN's Survival Service Commission urged that zoos stop buying the species, to dry up the market for trappers and traders.

Several zoo federations, including the American Association of Zoological Parks and Aquariums, pledged their members to comply. Most reputable animal dealers deleted the species from their price lists. The Wild Animal Propagation Trust (WAPT), a North American interzoo group that promotes captive breeding, set up a committee to see what could be done with the golden marmosets in zoo collections.

As a member of IUCN's Survival Service Commission, I was keenly interested in Coimbra's proposal for a preserve, but when I visited him in the fall of 1970 most of the news was bad. More of the forest habitat had been cleared. Two new threats had appeared: a highway that would cut through the remaining forest, and a canalization-drainage project that would destroy the rest. Coimbra predicted gloomily that the golden marmosets would be gone in two or three years.

Ultimately, a two-part strategy evolved. Outright purchase of 8,000 acres would be much too costly for any private group to contemplate. Official action would be required: a Presidential decree expropriating the land, with ultimate compensation to the landowners. While this action moved through time-consuming procedures, a field station would be built in Tijuca National Park, an unusual park inside the city limits of Rio de Janeiro and within the original range of the golden marmoset. Coimbra would trap golden marmosets living in doomed forest pockets, bring them to the station, and keep others in large outdoor

cages. Their offspring could be released in Tijuca Park if the preserve had not yet been established.

The plan was largely the work of Dr. Alceo Magnanini, Coimbra's friend and past collaborator in field research. As an official of the Instituto Brasileiro de Desenvolvimento Florestal, Magnanini's responsibilities include planning and acquisition of park and preserve lands. He was able to arrange for the survey of the proposed preserve at Poço das Antas and recommend that the site be expropriated. He was also able to have a small site in Tijuca Park set aside for Coimbra's temporary field station. The Tijuca plan made sense. It could go ahead at once. It needed only money, and we hoped this would be provided by the World Wildlife Fund, IUCN's companion organization.

Meanwhile, in North America, the WAPT Golden Marmoset Committee had assembled disturbing facts about the captive members of the species. Their number was showing a slow but alarming decline. None had been imported since the voluntary ban in 1968. The life expectancy of the species is about ten years, but of 55 wild-caught marmosets held in American zoos in 1968, 30 had died by 1971.

Almost two-thirds of the 70 animals in North American zoos had been born in captivity. This would be encouraging but for the dismaying fact that zoo-born pairs had generally failed to mate and produce young. In its first survey, the committee could find only a single case of such a second-generation birth. Later, one more was traced, but the general lack of success pointed toward attrition.

Some aspects of golden marmoset husbandry had markedly improved. In the absence of field-study information, it had been assumed that the natural diet was chiefly fruit. Now it was recognized that the marmosets need large amounts of protein. Drastic revision of zoo diets was keeping adult marmosets in better health, maintaining their glowing color, and preventing rickets in their offspring. Understanding their territoriality explained why fatal fights had sometimes occurred, so most zoos now kept adult pairs in separate cages.

But why did zoo-born pairs fail to mate? WAPT committee chairman Donald A. Bridgwater, director of the Minnesota Zoological Garden, sought enlightenment from Coimbra and other observers, notably Frank DuMond, proprietor of Monkey Jungle in Florida, who has a special interest in the species. How does captivity interfere with the mating urge?

The answer seems to lie in their natural behavior.

Mr. Perry, a member of the Survival Service Commission of the International Union for the Conservation of Nature, is assistant director of Smithsonian's National Zoo.

This elusive flash of gold in the sun-dappled canopy is another Monkey Jungle captive.

Golden lion marmoset

When young are born, usually twins, they cling to the mother almost from the hour of birth. Soon after a recent birth at the Smithsonian's National Zoological Park, I saw two pairs of tiny beady eyes just above the mother's shoulders. Five days after this birth, the mother seemed restless. Repeatedly she approached the male and rubbed against him. It was time for him to do his share. By the following day, the transfer had been made, and thereafter the twins spent much of each day clinging to their father. In the wild, the father also shares the burden of parental care.

Within a few weeks, the young begin brief excursions on their own. Soon they are quite independent, but even when the next young are born the juveniles maintain a family association. In nature, they can roam more freely; other adults accept their presence. Thus they encounter other maturing juveniles, eventually select mates and a new pair sets up housekeeping in a territory of its own.

Zoo cages provide little opportunity for acting out this sequence of events. Young have been born, often. But separation from parents is more likely to be abrupt than gradual. And, once removed from the parental cage and placed in another, the juveniles are not in free association with prospective mates.

When the Bridgwater committee made its first study, the 70 golden marmosets were scattered through 19 zoos, less than four per collection. Four zoos had only single animals. Several had extra males. The two largest collections were at San Diego (three males, five females) and Monkey Jungle (four males, three females). Under these circumstances, new pairs are formed by the zoo-keeper's choice, not their own. A single female may be caged with a male bought or borrowed from another zoo. If immature, they may form a brother-sister relationship, inhibiting mating. If adult, they may not be compatible.

The Bridgwater committee saw hope if two things happened. First, capable scientists should review every available scrap of data about marmoset husbandry: behavior, physiology, diet, disease. Second, the captive animals should be clustered in a few breeding centers where special facilities and care should be provided.

A long step toward the first goal was taken in February 1972, when Coimbra, Magnanini and two dozen specialists from North American universities, zoos and primate centers assembled for a working conference at the Smithsonian Institution's National Zoo. The consensus was that all marmosets have much in common; experience gathered in work with other species can be carried over to the golden marmoset—with caution. That helped.

Frank DuMond told a story which offered a clue to more successful matings. He had placed pairs in adjacent cages separated by wire mesh. They failed to mate, but the males began courting the other females through the wire. Responding to their evident preferences, he had made the exchange, and he thought at least one female was now pregnant.

A zoo with a single breeding pair is at a loss when young are born and approach maturity. To find mates for them, some sort of exchange must be arranged with another zoo. Thus a male and female may be brought together, but with no assurance of mating. Only in a large collection is it possible to experiment readily, making trial combinations, perhaps even placing a number of juveniles in a community cage until pairs are formed by natural choice.

DuMond, with scientific help from Bucknell University, offered to expand his facilities at Monkey Jungle by building new cages in an off-exhibit area.

A baby, one of twins born at the National Zoo last summer, clings to a parent's back.

Shortly before the conference, the National Zoo broke ground for a new building which will be set aside entirely for marmoset research and breeding. Several other zoos have asked the Bridgwater committee for designation as breeding centers.

Magnanini and Coimbra brought good news to the Washington meeting. The Poço das Antas preserve was close to becoming a reality. The expropriation decree awaited only the signature of Brazil's President. The Tijuca field station was even closer to realization. Cages were under construction.

Further, the U.S. National Appeal of the World Wildlife Fund had sent the first $5,000 for the Tijuca station. While this is only a fraction of the first year's requirement, it was encouraging.

Will the golden lion marmoset be saved? At press time, the decree has not yet been signed. Owners of the Poço das Antas land are still cutting trees. The World Wildlife Fund has sent another $5,000 for the Tijuca station, but more money is needed before it can be fully stocked and operational. No more second-generation births have occurred in zoos, and the captive population is still declining.

Even if all goes well, the species will never again be entirely safe. An 8,000-acre preserve will not support many marmosets—Coimbra hesitates to predict how many—and a single population is subject to disaster. Poaching may not have been entirely stopped; there are occasional rumors of golden marmosets being smuggled across Brazil's border, and certain dealers say privately they can supply them to anyone willing to buy contraband animals.

Zoo breeding may succeed, but the available time is desperately short, the wild-caught stock fast vanishing. Intensive research should have begun five years ago. Now, if one hypothesis proves wrong, there may not be time to test another. And even if zoos are on the right track, the centers can accommodate only a few dozen animals. Something will have been gained, however, even if the golden marmoset is lost. Brazil, a huge and diverse nation, has many acute conservation needs. Because of the golden marmoset, more Brazilians, students and ordinary citizens as well as leaders, now realize that their nation's wildlife is in danger and that it is worth saving.

Perhaps most important, the golden lion marmoset exercise has demonstrated that an effective conservation effort must link together field and laboratory scientists, lawyers, politicians, administrators, propagandists and private citizens—and that it can be done.

The marmoset's best hope, Dr. Adelmar Coimbra, watches over cages in a temporary refuge built in Rio.

WE'RE ALWAYS ANXIOUS to put up the tree in Jack Daniel's old office. When that's done, we know the holidays are here. We hope your plans are coming along too, and that you have a Merry Christmas and a Happy New Year.

CHARCOAL MELLOWED DROP BY DROP

TENNESSEE WHISKEY • 90 PROOF
DISTILLED AND BOTTLED BY JACK DANIEL DISTILLERY • LYNCHBURG (POP. 361), TENNESSEE

© 1972, Jack Daniel Distillery, Lem Motlow, Prop., Inc.

Christmas

Master of St. Lucy Legend
National Gallery of Art

8c U.S.

One billion stamps from a little corner

Nearly one billion pairs of angels, the musical duo shown above, will be circulating in the mails on one of two new Christmas stamps. The angels are a detail from the upper right corner of a medieval Flemish painting (opposite). The 85-inch-high picture, probably painted during the 1480s, is the work of an anonymous artist who has been called the Master of the Saint Lucy Legend because he painted a picture of Saint Lucy for the church of Saint-Jacques in Bruges.

The title, *Mary, Queen of Heaven,* is derived from the music, held by the angels on either side of Mary's head, which has been identified as the hymn *Ave Regina Celorum*. The angels on the stamp play a soprano shawm and a vielle, forerunners of the oboe and violin. A member of the stamp committee, Bradbury Thompson, who was the consultant for the original format of SMITHSONIAN, designed the stamp. It is shown here more than twice actual size.

Samuel H. Kress Collection, National Gallery of Art, Washington, D.C.

Giles works in a studio arranged with precision. The helmets are for reference use in the many cartoons in which he satirizes the police.

Opposite: "Taxi!" This famous wartime cartoon demonstrates Giles' ability to poke fun at national foibles (in this case American) without malice.

By Timothy Green

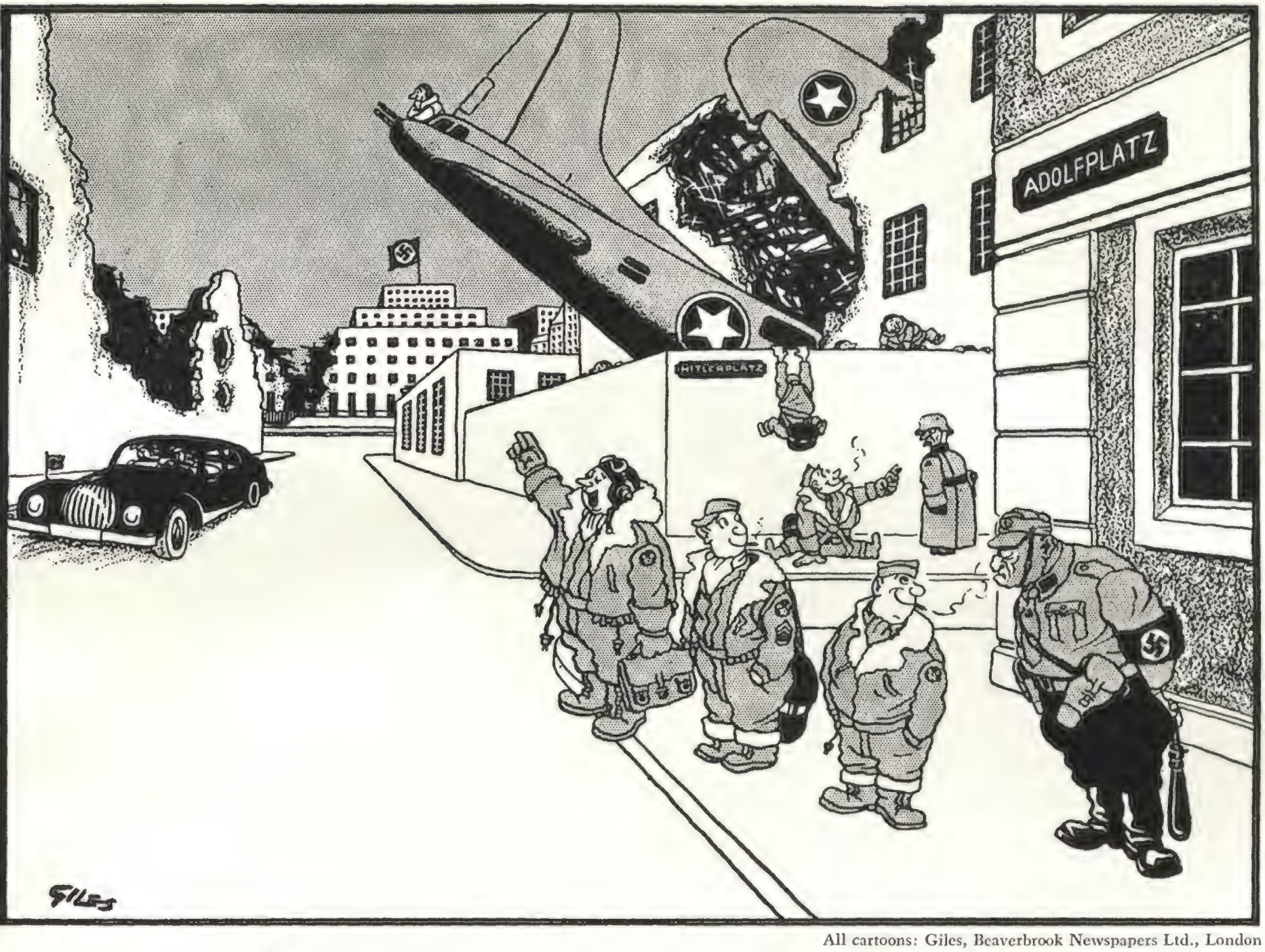
The humor, sharp but sympathetic, of cartoonist Giles

For a generation his drawings in London's Express *newspapers have been windows through which the British see themselves*

Remember that cartoon of an American bomber crash-landing smack in Adolfplatz in the heart of Berlin, the crew casually scrambling out and hailing "Taxi!" to a passing German staff car? It was tacked up in almost every U.S. Air Force squad room in the European theater back in 1944. The drawing, by Carl Giles in the London *Sunday Express,* was a friendly tilt at heavy-tipping GIs who commandeered from the British every taxi going.

Giles had a fond field day with Americans throughout the war. Another of his cartoons showed a bunch of them making a quick getaway across Westminster Bridge with the clockface of Big Ben atop their truck, as a bystander remarks to a stone-faced bobby, "Rare boys for souvenirs, these Americans." And when peace came, there was a GI taking his startled British bride back to a ramshackle log cabin in the sticks to meet his corncob-pipe-smoking folks (page 58).

Well, these days the GIs are long since gone from the pubs of Suffolk on the east coast of England, where Giles got to know them almost 30 years ago. But the



All cartoons: Giles, Beaverbrook Newspapers Ltd., London

cartoonist himself is still there, reminiscing with the local farmhands as they quaff Tolly's Special Light Bitter in the Maybush at Waldringfield or the Barley-mow at Witnesham. And his pencil is as busy as ever sketching out three cartoons a week—two for the *Daily Express,* one for the *Sunday Express.* For a whole generation Carl Giles has turned his humorous eye on everything from moon landings to the Royal Family, from Bobby Fischer's chess shenanigans to hijackings (page 63). But most of all he has drawn the ordinary people of Britain at home or in the betting shop, the pub, the factory or down on the farm. In the world of topical cartoons his are probably the most humorous since those of an American counterpart, the late J. N. Darling (Ding).

"His oblong space in the *Express* newspapers," one critic remarked, "[became] a window into which the British public peered day after day to see themselves, reacting to history through more humorous, more tender and infinitely more sensitive eyes."

And his extraordinarily observant gaze captures them just as they are. His shopgirls stand, like shop-girls everywhere, wearily on one leg, with the other tucked up behind them; his old farmhands in the pub have endured years of sun, rain and wind in the fields; his policemen have just that right combination of severity and glee upon their faces as they open their notebooks. And the Giles "family," which turns up regularly in the drawings, is every suburban family in microcosm. There is father engrossed in the sports pages, mother never far from a stack of dirty dishes, and a motley array of children and grandchildren creating constant mayhem. Not forgetting Grandma (page 59), a forbidding old battle-ax much given to betting and liquor.

Venturing down to see Carl Giles in deepest Suffolk, one takes the train from London through the East Anglian countryside, past green woods and golden

Timothy Green, formerly editor of the London Illustrated News, *wrote the article on the King Tut exhibition in* SMITHSONIAN, *June 1972.*

Giles documents a case of transatlantic cultural shock: "But, honey," says the GI, "where did you get the idea that all Americans live in skyscrapers?"

grainfields. Giles himself is pacing up and down outside the station at Ipswich, a brisk, white-haired figure in his fifties, dressed in a white turtleneck sweater, blue slacks and blue boating sneakers. We scramble into his black Aston Martin DBS and zoom away toward his studio nearby in the Buttermarket. "The penalty of working for Fleet Street," he says, "is that the studio must be close to the train. The cartoon has to be on the 4:30 to London."

At first glance the studio looks more like a dental laboratory than a cartoonist's workshop. A huge swiveling drawing board festooned with lights and electronic gadgets dominates the room. The tools of his trade, pencils and brushes are laid out meticulously all around; a big eraser dangles from a piece of string. The incongruous note is three police helmets prominently displayed on a shelf. "Helmets are easy to knock off, but not to draw," he says.

Policemen are always cropping up in Giles' cartoons because so many of them are based on the day's news. "What I try to work out," says Giles, perched on a high drawing stool beneath his helmets, "is what everyone will be talking about at the bus stop tomorrow morning. The best story ever, of course, was Christine Keeler; I lived for six months off her escapades."

His day starts shortly after 6 A.M. when eight London morning newspapers arrive at his 17th-century farmhouse just outside Ipswich. Giles and his wife Joan (who keeps the complex files of his hundreds of cartoons in immaculate order) start going through them, fortified by gallons of tea. The radio is also on all the time. On Mondays, Wednesdays and Saturdays, when he has to draw for the *Express,* he listens to every news bulletin in order to be on top of any breaking story. By midmorning he has distilled out his theme for the day and heads for the Ipswich studio. The prospect of having to come up with three sparkling ideas a week, year in year out, does not seem to daunt him. "It becomes a habit," he explains, "I don't agonize over the drawings." The actual cartoon is usually completed in a swift three hours—precisely on time for that afternoon train. "I've never missed a deadline yet."

Whatever the topic of the day, the essential thing is to keep drawing. It has always been an obsession for him. While several of his ancestors had been jockeys, young Carl Giles took more happily to the pencil than the saddle. He grew up in the rough, tough environment of London's City Road between the two world wars. His father kept a small shop near the famous Angel pub in Islington, and the family lived in a flat above. "City Road was a bloody awful dump," he says.

He couldn't get out of school fast enough. "In fact," he recalls, "even before I left school at 14 I'd been working at night in an animated cartoon studio in the Charing Cross Road cleaning brushes." Soon he joined the 30 animators there making short cartoon films. "You learn more working alongside other animators than you could possibly learn in art school."

The early years were hard. "The age from 14 to 18 is one of the longest periods of your life," Giles reflects. He tried his hand at all kinds of things—even giving riding lessons, although he clearly lacked the talent possessed by his jockey forebears. He spent a year roaming round England playing an accordion in pubs and earning "just enough for digs and beer." He also went down to Suffolk for a while to help out a struggling animated cartoon studio in Ipswich. That visit

was auspicious; he became deeply attached to the Suffolk people and the rolling countryside. Although he went back to London in 1937 to work as a cartoonist for the left-wing Sunday newspaper *Reynolds News,* he longed to return.

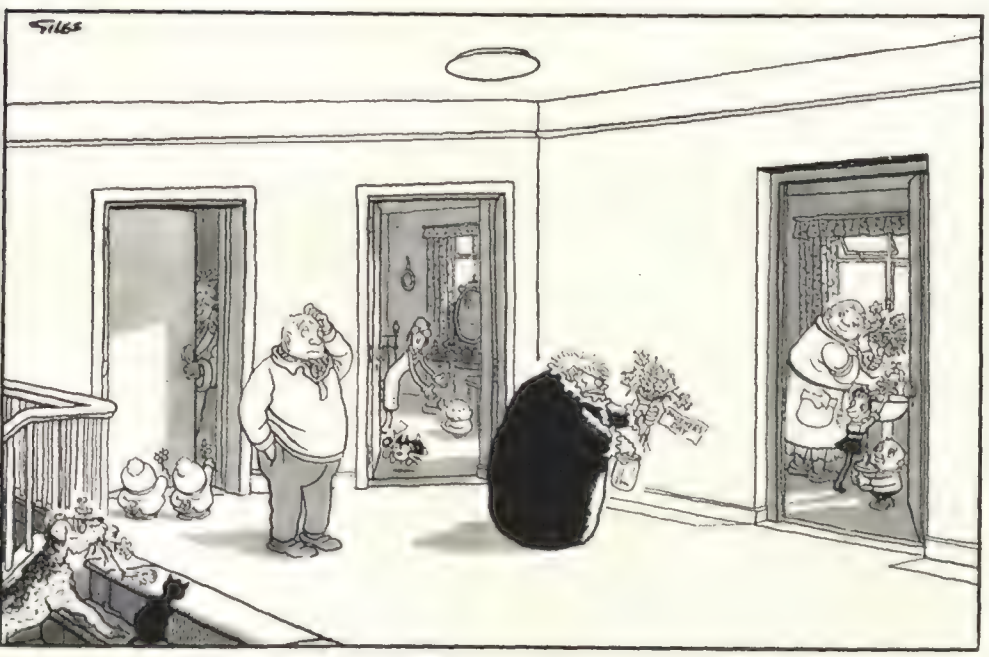
The excuse came when his home in London was bombed out. "I took a farm cottage in the village of Tuddenham near here and grew to be part of the place," he says happily. "My sole reason for coming back was nostalgia. What I like about East Anglia is that no one comes through here unless they have to. Ten minutes away from the main road or the railway, it's back into the Middle Ages."

In wartime, however, things were a little different. The grainfields had been turned into airfields for the U.S. Air Force. "There were more Americans than natives living here by the end of the war," Giles recalls. He got on famously with them even though, as he admits cheerfully, "Most people remember them for nicking all our taxis and all our women, rather than for winning the war."

In the Suffolk pubs they crowded round Giles with his accordion and after closing time the parties adjourned to his cottage. Besides discovering the ease with which he could make friendships—many of which continue today—he found the Americans "lovely to draw—all those different colored trousers and jackets, and all the decorations and the stripes."

After D-Day he followed the Americans, as a war correspondent for the *Daily Express* (which he joined in 1943), through France, Belgium and Holland. He traveled chiefly with the U.S. First Army. The GIs liked his drawings as much as the British; they clamored for the originals. The original of "Taxi!" went to Patton and then, following his death, to Eisenhower.

Giles' love affair with the Americans did not end with the war. In 1948 he went over on the *Queen Mary* to spend three months driving 10,000 miles in a meander from coast to coast, and went back again a decade later. He drew a cartoon of the rush hour in the New York subways, showing a mad scramble of commuters fighting to get on the "A" train as he stood unruffled in their midst, admonishing them: "One difference between the Americans and the British is that Americans rush everywhere and get nowhere, whereas the British don't rush." Out West he sketched a saloon draped with gun-toting cowpokes downing their whiskey; enter Giles and family, who troop up to the bar and request "A pot of tea for three, please."



Grandma, a popular member of the Giles "family," reacts characteristically to her Mother's Day presents: "Damn flowers—never a bottle of Scotch."

A disease called sailing

The annual horde of American tourists to Britain also comes in for some gentle ribbing. After the dollar crisis in 1971, Giles drew a tearful guide at Anne Hathaway's cottage reaching into his pocket to tip the poor U.S. tourists. "Nixon's U.S.-on-the-rocks speech sure helped our overseas economy," beams a Texan from beneath his Stetson. "Honey, that's the third Guide who's tipped me this morning."

At home in Suffolk, Giles keeps up with his old wartime acquaintances. The U.S. Air Force has not vanished completely, either. As we are talking, a flight of U.S. jet fighters from the airbase at Bentwaters, near Ipswich, comes screaming over the town. Their roar reminds Giles that it is high time we set off from the studio in Ipswich to the little village of Waldringfield, just across the River Deben from the airbase, where he keeps his boat. He is eager to get down there. "I have this disease called sailing," he says, almost apologetically, as we zip off in the Aston Martin.

Presently we negotiate a narrow dead-end lane that leads down to a winding river fringed by trees. The tide is out leaving a scar of mudflats along the bank, but standing out proudly in the main channel is a 28-foot, four-berth yacht, with the name *Oleander* painted in bold black letters on her. He cherishes the boat like a baby. He is never happier than when he is messing about in her, taking her down the Deben in a good breeze to the open North Sea.

His love of boats comes out more and more in his drawings. As we step inside the bar of the Maybush Inn right by his mooring, there on the wall is a huge blowup of a Giles cartoon depicting the weekend boating chaos on the river outside (pages 60-61). Giles has signed it: "To the Maybush and all who sail in her."

On Sundays, Tuesdays, Thursdays and Fridays, when he does not have to draw for the *Express,* the best place to look for him is aboard the *Oleander.* But

to cope with sudden inspiration, a long white trailer is tucked into the parking lot of the Maybush. It has been his office on wheels for more than 20 years and he has fitted it out for his own special needs. "We've towed it all over Britain by Land Rover," he explains.

His adventures along the way are part of the continuing saga of the Giles cartoon family. Although in reality only Giles and his wife make the trips, the cartoons show a full family cavalcade of Grandma, father, mother, five children, one daughter-in-law (an anemic little specimen called Vera, to whom, as Giles put it, "Aspirins are as important as brandy is to Grandma"), and three grandchildren. Trouble is ever in their wake. Passing Stonehenge, the kids are intercepted by a bobby as they stagger off with one of the mighty stones as a souvenir. "Now suppose we put it back where the Druids left it," says the Law, leaning on his bicycle. As for Grandma, she ends up in a tree chased by a pack of hounds that have scented some vintage fox fur she is wearing.

Grandma, without doubt, is the most beloved of all Giles' characters. "All my grandmothers were like her," Giles says cheerfully, "reeking of embrocation and wintergreen ointment. But I can never understand her appeal. I've tried to knock her on the head several times as a spent force—after all, people like Elizabeth Taylor can be grandmothers nowadays—but if she doesn't turn up for three weeks, then the letters come pouring in." So Grandma goes battling on, playing the horses, pinching money from the children's piggy banks and belting anyone who doesn't agree with her no-nonsense political views.

Grandma has also been known to take up her pen.

Giles' research often takes the form of a chat over a pint in his favorite pub, the Maybush Inn.

A blowup of this Giles cartoon, showing the weekend crush outside the Maybush, hangs in the bar. The

caption ironically quotes Masefield: "I must down to the seas again, to the lonely sea and the sky."

She recently weighed in on Women's Lib. "I am writing to say that I burnt my brassiere at a mass rally of 4 of us in 1930," she scrawled. "It did not receive the publicity it should have done at the time because a lot of people thought it was the R-101 going up." (The R-101 was a British dirigible that crashed in 1930.)

Giles has never fallen into the trap of having an office at the *Daily Express* in Fleet Street; indeed, he goes there as little as possible. Instead, as a people's cartoonist, he is out all the time among the grass roots. At the same time he has organized his life with rare skill. How many of us can boast a mobile office parked by our favorite pub in sight of our boat?

But this is the essential source of his inspiration. The people he chats with every day in the Maybush and the other country pubs nearby are precisely those who will be reading his cartoon next morning. Their preoccupation that day is the surest guide to what he should single out for tomorrow's cartoon.

As the Maybush fills up with people coming off their boats for a pre-lunch pint, Giles suggests we have time for another quick one in his other "local," the Barleymow at Witnesham, just down the road from his 280-acre farm. Nowadays the farm itself is run by a tenant, although Giles himself has become a deft hand at farming over the years. Just after the war, when pork was desperately short in Britain, he became an expert on pigs. And pigs, of course, turned up in his drawings. "I like drawing pigs," Giles says. "Despite their popular image, they are sad, clean, fastidious animals, very delicate in their manners."

When we pull into the Barleymow, his Aston Martin draws glances of admiration from the villagers playing darts and shove-halfpenny in the bar. "What about the problem with a car like that, with our maximum 70-miles-an-hour speed limit?" someone asks. "I have two cars," Giles comes back easily, "so that allows me twice 70—140 miles an hour. So I leave one car at home and do 140 in the other."

Boats, cars and gadgets

He loves cars almost as much as sailing. He does all the work on them himself, in an elaborate workshop tucked around the corner of the farmhouse. The workshop looks like a small factory, filled with lathes, drills and electric saws. But the only workman is Giles. Here he has built his mobile studio, tended his cars, and made most of the fittings for his boat. His passion for gadgetry extends into the house. The living room is partly taken up with a complex tape-editing console, and a table football game.

Giles' wife Joan, whom he has known since they were both small children up by the Angel, Islington, has lunch set out for us. The walls of the dining room are lined with originals and reproductions of some of his most memorable cartoons. Giles points out one hanging beneath "Taxi!" and recalls that it was triggered off by the Duke of Edinburgh's remarking once that the *Daily Express* was a "bloody awful newspaper." Giles was right on top of it next morning with a drawing showing Lord Beaverbrook, the *Express'* proprietor, being led in chains through Traitor's Gate at the Tower of London surrounded by a guard of Beefeaters (opposite).

No sooner was the *Daily Express* out than Giles' phone rang. "This is Buckingham Palace," said a somewhat pompous voice. Giles replied with a choice phrase and hung up. A few moments later, the phone went again. It really was the Palace, the voice explained. "Her Majesty is requesting the original of your cartoon to give to her husband as a memento of his most glorious indiscretion."

And this, of course, has been part of the pleasure of working for the *Express* for half a lifetime (he will celebrate 30 years with them next September). "The *Express* is the big platform, it gives you the big audience," he says. "If I was on the stage, I wouldn't want to play in some small neighborhood theater, but at the London Palladium. For a cartoonist the *Express* is the Palladium."

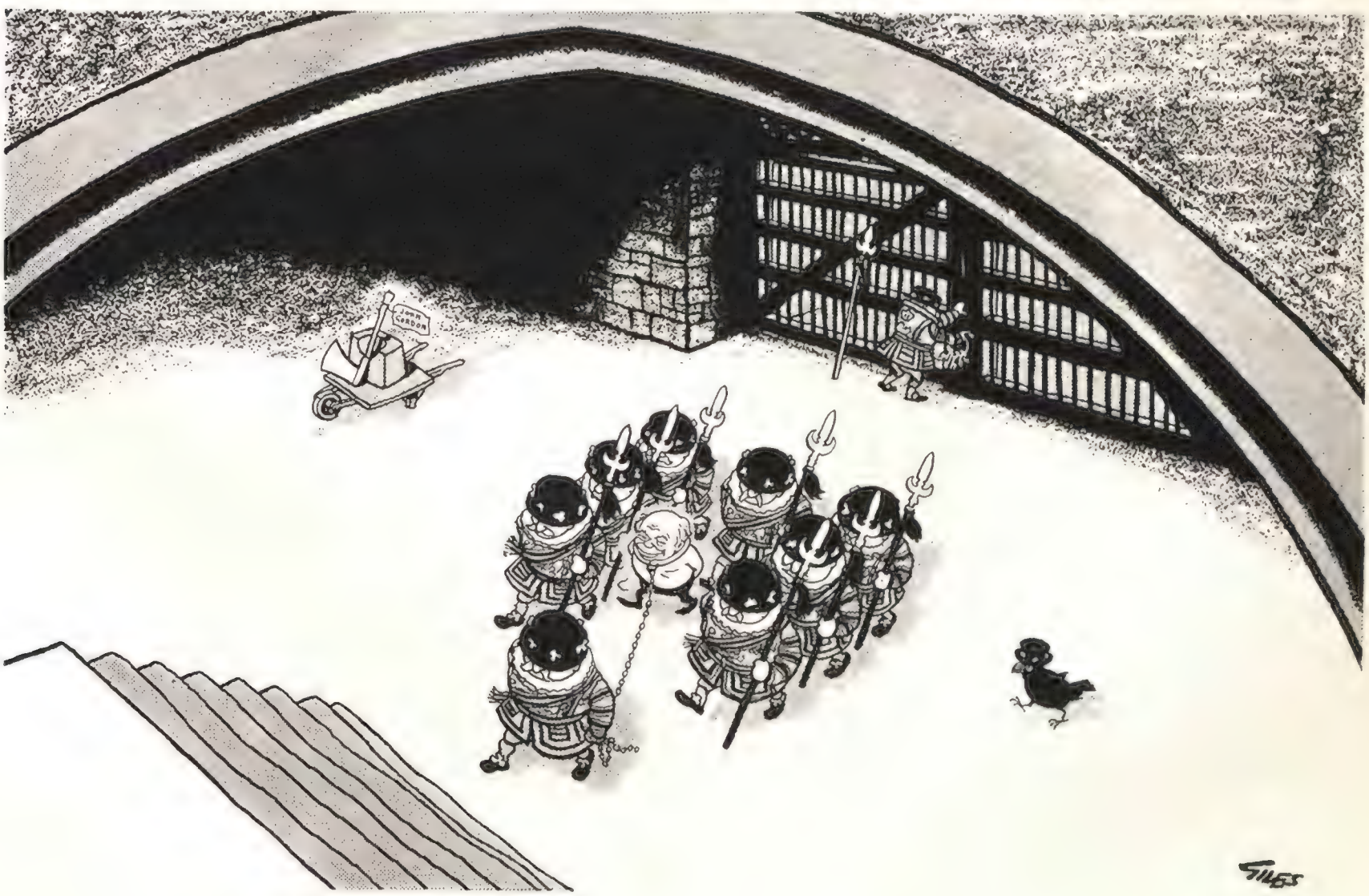
The essence is attack

He is less than enchanted with American political cartoonists. "What surprises me," he continues, "is that in 1972 in the United States—that great self-supporting, mass-producing nation—they still have such bloody awful political cartoonists, stuck with drawing bearded Uncle Sams, the Stars and Stripes, donkeys and elephants. The reason, I'm sure, is that there aren't many big left-wing publications. I doubt if it is possible to do a serious right-wing political cartoon. The essence of the great cartoonists—from Hogarth and Goya to Sir David Low—is attack. And the haves can't attack the have-nots."

Giles himself, working for a right-wing paper like the *Daily Express,* tries to keep politics out of his cartoons, for his beliefs would almost inevitably tangle with those of the paper. His real strength is his warm-hearted humor, which has allowed him year after year to capture the feelings of the ordinary people and to be on their side against the pomposity of politicians or bureaucrats. Perhaps one of the best appreciations of him harks back to those old wartime cartoons with which he originally made his name; an admirer wrote, "Somehow, magically, he took the terror out of it all." Thirty years later, the people in the queue at the bus stop who smile at his cartoon in the morning get on the bus feeling that life may not be so bad after all.

Aspirin-addicted Vera is accosted at the airport: "Psst! Lady—want any anti-hijack pills, ten dollars a dozen?" Other members of the "family" are mother, father, Grandma and assorted kids.

The Duke of Edinburgh called Lord Beaverbrook's *Express* "a bloody awful newspaper." "Ah, well," says Lord B. in Giles' cartoon, "at least he takes it or he wouldn't know it was a bloody awful newspaper."



National Museum of History and Technology,
gift of Mrs. Thomas W. McElrath

This doll, from the Smithsonian collection, probably made in Europe c. 1875, is turned out in a silk dress, velvet hat and fancy pantaloons.

Photographs by Herman Landshoff

Beloved playmates among the dolls

A fascinating new collection explores the fanciful playthings of another era, prized as much now as by their original owners

In their day, the dolls on these pages must have been objects of passionate affection, probably considered by their young owners to be almost human, having real sensations and emotions. Now antiques, they have a somewhat different kind of appeal for adults, who prize them for the craftsmanship with which they were made and for their period fashions. Oddly, while it is known that there were dolls as far back as 3000 B.C., there is little in the way of recorded history on them. Often discarded after their owners grew up, dolls were usually ignored by scholars and museums. If by chance they were preserved, they were seldom accompanied by any records of their origin or owners. Consequently, these once beloved, still enchanting objects that provided so much companionship are now orphaned survivors of a distant and unrecoverable Christmas past.

Delightful dolls from many periods and cultures have now been brought together in a lavish and fascinating new book, *The Doll* (Abrams), with text by Carl Fox, former director of the Smithsonian museum shops. Fox and photographer Landshoff traveled the Eastern seaboard, looking at some 40,000 dolls—among them, grotesque golliwogs and Kewpies, sinister voodoo dolls and brightly painted Indian kachina dolls from the Southwest—before they winnowed their final selection of 191 illustrations.

Perhaps they were fortunate to have found such a relatively small number of dolls, for as Victor Hugo noted, "In the same way as birds make a nest of anything, children make a doll of no matter what."

Margaret Woodbury Strong Museum of Fascination, Pittsford, N.Y.

A sisterly pair of German maidens, with painted bisque heads, are elaborately garbed in satin with lace overskirts. They date from around 1880.

Collection Margaret D. Patterson, Sand Lake, N.Y.

In the 1880s, French dollmaker Léon Casimir Bru gave this little girl glass eyes and a swivel neck.

These stylishly dressed *bébés* helped educate *jeunes filles* in current fashion.

Collection Frances Walker

Chester County Historical Society, West Chester, Pa.

A 19th-century English lass, wearing high-button shoes, poses before an antique sign from Pennsylvania.

Margaret Woodbury Strong Museum of Fascination, Pittsford, N.Y.

This line of ceramic bathing beauties in knitted swimsuits was made in Germany in the early 1900s.

Courtesy Biltmore House and Gardens, Asheville, N. C.

Olmsted posed in a garden setting in about 1895
for this portrait by John Singer Sargent.

By Tanya Edwards Beauchamp

Renewed acclaim for the father of American landscape architecture

A 150th birthday salute to Frederick Law Olmsted, who not only designed city parks but also promoted a national parks system

In the mid-1860s, when construction of New York's Central Park was under way, the *Herald Tribune* editorialized on the folly of the undertaking, prophesying that it would "be nothing but a great beer garden for the lowest denizens of the city," that decent citizens could not safely venture there, that real estate bordering the park would be adversely affected, and that only the grog shops would benefit from its presence. The park, of course, was successful.

Citizens of all classes flocked to this idyllic 840-acre expanse of trees and grass and water. In a single day, visitors often numbered as high as 80,000 persons on foot, 30,000 in carriages and 5,000 on horseback. It was the scene of family outings, of wedding parties, of school excursions. Doctors sent their patients there to convalesce. As a lure in attracting tourists and wealthy new residents to the city, it was said to outweigh "all the colleges, schools, libraries, museums and art galleries which the city possesses." Ruffianism was negligible (at least then), the neighboring grog shops were emptied, to be replaced by classier establishments, and the value of real estate along its seven-mile boundary appreciated by leaps and bounds.

Frederick Law Olmsted, who collaborated on the design of Central Park with architect Calvert Vaux and supervised its construction (see page 71), went on to design 16 more large parks and as many smaller ones in cities across the country. He also designed suburban developments and college campuses, private estates and institutional grounds, becoming America's first landscape architect and city planner. In an era of unprecedented industrial and urban growth, he saw the opportunities and responsibilities in his time for favorably influencing the health and spirit of city dwellers for generations to come. Yet he referred to himself as a "wholly unpractical man" to distinguish himself from those men—all too numerous then as now—who prefer to define practicality entirely in terms of the nearest dollar.

This year marks the sesquicentennial of Olmsted's birth. Probably more acclaimed now than at any time during his lifetime, Olmsted is being honored with numerous exhibitions, parties in the parks, newly published books and environmental festivities in many American cities. Currently, his work is being celebrated in two major exhibitions—"Frederick Law Olmsted's New York" at the Whitney Museum of American Art in New York (through December 3) and "Frederick Law Olmsted/U.S.A." at the National Gallery of Art in Washington, D.C. (through January 7). A supplemented version of the latter show will be circulated by the American Federation of Arts to several other cities, including San Francisco, during the next two years.

Born in Hartford, Connecticut, in April 1822, Olmsted was the son of a well-to-do merchant. Unable to attend Yale because of an illness temporarily affecting his eyesight, he was apprenticed in 1837 to a civil engineer. In 1843, he sailed as a crew member on a ship bound for China. The following year he joined his brother John—then a premedical student—at Yale. Though he did not matriculate, he participated in the life of the college, attending lectures on scientific agri-

Mrs. Beauchamp, a specialist in 19th-century American architecture, is currently doing research on outdoor sculpture in Washington.

culture. In 1846 he apprenticed himself to a farmer in Onondaga County, New York. With the financial backing of his father, he then established himself as a farmer, first in Guilford, Connecticut, and then, in 1848, on Staten Island, New York, where he operated a fruit tree nursery and began writing for various agricultural journals.

In 1850, Olmsted, accompanied by his brother and a Yale friend, made a walking tour of Great Britain and parts of Western Europe. His published account of this tour, *Walks and Talks of an American Farmer in England,* led the *New York Times* to send him on reporting assignments through the troubled South and Southwest. Making three trips between 1852 and 1854, he filed dispatches that earned him a lasting reputation as an observer of unusual perception. His three books on the antebellum South were eventually compiled into one volume, *The Cotton Kingdom,* which is still in print.

Olmsted was 35 in 1857 when he sought and obtained the post of superintendent of the site set aside as Central Park. Until then he had never seriously considered becoming a landscape architect. But the following year Calvert Vaux persuaded him to collaborate on what was to be the winning park design.

Later, defending himself against charges that he had become an instant landscape gardener, he answered: "It is true that I had not set up to be a landscape gardener before I came upon the park. I had not thought myself one, and had been surprised and delighted when I was asked if I would accept even a journeyman's position in the intended work. Why? Simply because I held the art in such reverence, that, to that time, it had never occurred to me that I might rightly take upon myself . . . its public practice. My study of it had been wholly a study of love, without a thought of its bringing me pecuniary reward. . . ."

Indeed, with his careful and sensitive observation of parks and natural scenery here and abroad, his theoretical studies, his practical experience with drainage, nursery stock and the management of agricultural labor, he was well qualified for the undertaking. But Olmsted's work at Central Park was marred by political infighting as he obstinately refused to put the interests of Tammany Hall ahead of those of the Park. He was maligned in the press and received threatening letters. His plans were frequently obstructed by "practical men," workmen and politicians. At one point he was brought close to nervous collapse. During the 21-year span in which he worked intermittently on the Park, Olmsted occasionally resigned, always to be reappointed.

Though he often had trouble with clients who didn't quite understand what he was doing or who weren't willing to spend enough money to do a thorough job, he never again experienced the bitter opposition he had met in the protracted construction of Central Park. During the late 1860s and early 1870s, Olmsted and Vaux went on to design Prospect Park in Brooklyn, the Buffalo and Chicago park systems as well as several college campuses and suburban areas in Riverside, Illinois, and Tarrytown, New York. He also devised a comprehensive plan for the development of Staten Island.

Park scenery should be pastoral

The urban landscape park was the nucleus of Olmsted's design thought. He envisioned it in its simplest form as a place where large numbers of people might find recreation in moving "among scenes that should be gratifying to their taste or imagination." A park should present the "greatest possible contrast with the restraining and confining conditions of the town, those conditions which compel us to walk circumspectly, watchfully, jealously, which compel us to look closely upon others without sympathy." In a park people should be able to meet in an open and friendly manner, finding pleasure in "a sense of enlarged freedom." The scenery should be pastoral—including greensward, with the light and shade of sunlight filtering through trees, a pleasing variety of foliage, expansive lakes, swiftly running streams and grazing sheep and deer. The city should be obscured from view by thick plantings of trees, architectural effects should be minimized, and distant views should be opened up.

Such a park would be, according to Olmsted, a "sustained landscape poem" wherein the visitor would himself become an element in the landscape. That the landscape was indeed a work of art and not a mere imitation of nature should always be evident.

While touring England, Olmsted had paid a visit to

Olmsted predicted that New York's Central Park (above, in an 1875 lithograph) eventually would be surrounded by "a continuous high wall of brick, stone and marble"—such as in the photograph below.

Birkenhead Park, designed by the architect Joseph Paxton. English parks so impressed Olmsted that he wondered: "What artist, so noble . . . as he who, with far-reaching conception of beauty and designing power, sketches the outline, writes the colors, and directs the shadows of a picture so great that Nature shall be employed upon it for generations." In practice, as Olmsted discovered, nature was far from the docile assistant this romantic idea implies. Topography had to be altered by blasting, excavating, filling and grading. Soil had to be drained and manured. New plant materials had to be selected with a view to their adaptability to climate and exposure. Even after all these preparations the success of the work was subject to the vagaries of weather, time, disease and maintenance. It is no wonder that after his career was under way Olmsted referred to landscape architecture as a fresco rather than an easel painting (see Dubos, p. 18).

In his design for Central Park, Olmsted drew heavily upon the vocabulary of the English landscape garden with its conceit of idyllic countryside, its illusion of unlimited extent. At Prospect Park in Brooklyn, which he and Vaux undertook in 1866, Olmsted brought his own version of the naturalistic style to perfection. Here he designed magnificent expanses of subtly shaped lake and meadow, surrounded by open woodland. Earth fills at the boundaries of the park were thickly planted to screen views of the town. Provision was made for concerts with the band playing from a pavilion on an island in a bay of the lake, while the audience listened from a natural amphitheater on the shore. In the woodland between the lake and meadow, a mountain stream was created, providing a charming diversity of scenic effects. At one side of the park a fenced grazing ground for deer was created. A well-thought-out system of carriage roads, riding trails and walkways threaded their way through the park, providing maximum access.

To Olmsted the urban park was kinetic in concept. Parkways could extend its benefits throughout a city, connecting with other recreational areas, cultural facilities and residential zones. It was in this development of the spatial dynamics of the urban park that Olmsted is most original and most divergent from his English antecedents. His linear parks, such as Seneca Park in Rochester, follow river banks for long distances, integrating river scenery with the city in a way that is far removed from the 18th-century English garden. His parks and parkways system for Boston—the so-called "Emerald Necklace"—connected the parks

Fenway Park in Boston was designed by Olmsted to comprise part of an "Emerald Necklace" of parks running through the city. This panorama is one of the National Gallery's circular projections.

and waterways of an entire region with continuous greenery.

At South Park in Buffalo in 1888 he proposed to unite the parks and parkways system of the city with the grandeur of Lake Erie. Here a flat, featureless, treeless, lakeside tract, subject to frequent flooding, was to be sculpted into an aquatic park. Boaters would glide through lagoons among islands designed to provide an intricate variety of scenery. There would be a protected haven for excursion boats and facilities for bathing. Unfortunately this park was never built.

In 1871 Olmsted and Vaux had proposed a similar system of interconnected parks for Chicago, a city that Olmsted considered "unfavorable to parks." But their plans for Jackson and Washington Parks were not realized. Two decades later, Olmsted took on the prestigious job of site designer for the Chicago World's Columbian Exposition of 1893—his last major effort in urban design. He chose a swampy site on the shore of Lake Michigan, the area that had formerly been set aside for Jackson Park. He dredged the marshes, deepened the lagoons, and designed the grounds to provide a pleasing variety of scenery. He deliberately planned the grounds so that after the neoclassical Exposition buildings were removed in 1895 the site could be easily and cheaply converted into what is now Jackson Park.

As a visionary, Olmsted did not limit his horizons to the urban landscape. He felt that superb natural scenery was a national resource that should be held in trust for the people by the government and that such land should be "devoted forever to popular resort and recreation." In 1864 he was appointed to head the commission drawing up a report on the future management of the Yosemite Valley, the first scenic area to be

Olmsted, visiting Yosemite in the 1860s, enjoys the natural scenery he helped save.

preserved by Congress. The "sublimity of the Yosemite," he wrote, required that prime consideration be "given to the danger that such scenes might become private property and through the false taste, the caprice or the requirements of some industrial speculation of their holders, their value to posterity be injured." He recommended that the area be kept as nearly as possible in its natural state, allowing only a minimum of access roads and other public accommodations. His report established a philosophical rationale for the preservation of national and state parks. Later he became involved in a protracted fight to save Niagara Falls from the encroachments of industry and preserve it as a public pleasure ground.

In 1872 Olmsted and Vaux dissolved their partnership by mutual agreement. Afterward, Olmsted's most notable new works included the design of the grounds and west front of the U.S. Capitol, the grounds of the New York State capitol at Albany, Mount Royal Park in Montreal, and an elaborate ocean resort at Rockaway Point, New York.

In 1883, five years after his connection with Central Park was finally severed, Olmsted permanently moved his home and office to Brookline, Massachusetts. Although he continued to design urban parks, his work became more diversified; his projects included the Smithsonian Institution's National Zoo, many private estates, and several train stations for the Boston and Albany Railroad. While he often collaborated with Henry Hobson Richardson, and other architects of national reputation, he increasingly came to rely on the assistance of men trained in his own prospering firm, including his stepson, J. C. Olmsted, and his own son, Frederick Law Olmsted jr. In 1895, Olmsted, his mind failing, entered McLean Asylum—the grounds of which he had designed—in Waverley, Massachusetts. He died there in August 1903.

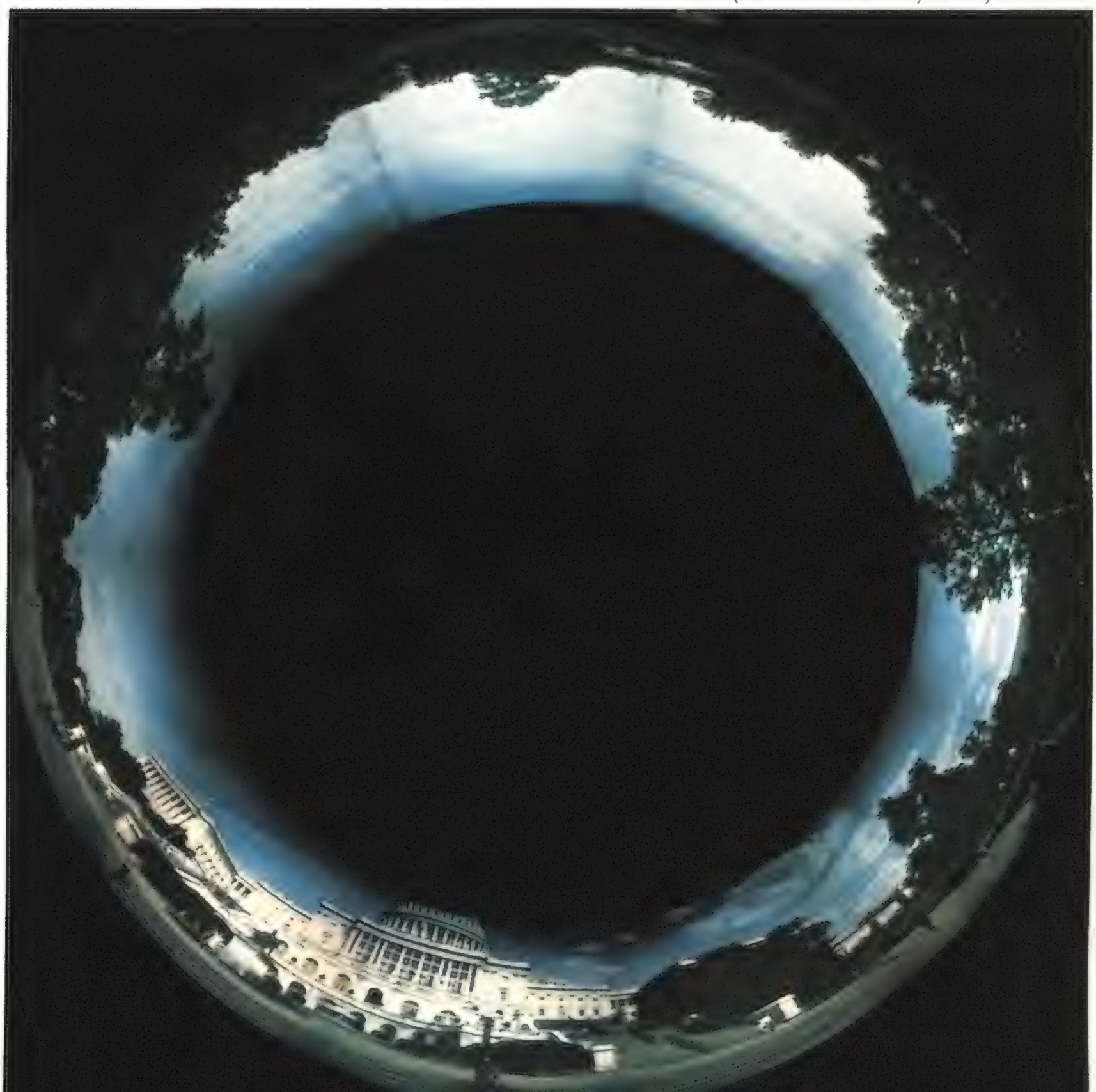
Not all of Olmsted's designs were executed. Some were done only halfheartedly, others have not been well maintained or have fallen prey to bulldozers, road-building or simple encroachment by non-landscape factors. Central Park is under constant threat of "improvements," ranging from new restaurants to new wings of the Metropolitan Museum of Art. And currently Olmsted's work on the Capitol is endangered by a Congressional commission that proposes to demolish the terraces and extend the west front.

Olmsted left an unusually complete record of his life and work. In addition to published records, the Library of Congress holds a collection of 24,000 items of personal papers, and more than 170,000 items comprising the records of Olmsted Associates, Inc. The latter covers the complete scope of the firm's work from 1858 until the present time. In addition, there remain in Brookline drawings, sketches and photographs documenting the work of this entire period. It is hoped that funds will soon be found so that these may be safeguarded, microfilmed and made available to scholars. The drawings are, after all, the real record of Olmsted's work and it is with them that all serious consideration of his design legacy must begin.

Toward the end of his life, Olmsted, looking back on the 17 large public parks and many smaller ones that he had worked upon, noted with satisfaction that "as they stand, with perhaps a single exception, they are a hundred years ahead of any spontaneous public demand. . . . And they are having an educative effect perfectly manifest to me—a manifestly civilizing effect." The renewed interest in Olmsted surely reflects a healthy concern for environmental design.

Olmsted landscaped the west front of the Capitol, shown above in a 360-degree photograph.

The National Gallery projects similar view on a circular screen (below, in worm's-eye view).



By Laura Marsh Henning

The versatile cockroach

These constant companions, which arrived long before us and may remain long after, deserve not only our hatred but a little respect

Roaches have their own style of block busting.

The world's most celebrated cockroach, archy, whose doings were chronicled by Don Marquis, was one of the few to find paste unpalatable.

Laura Marsh Henning, a free-lance writer and editor, has written for the New York Times.

A freshman Congressman recently vowed not to return to Washington after his first term, complaining: "I could fight apathy. I could fight pork-barrel politics. I could fight overspending. I could fight the military. But I couldn't fight the damned cockroaches."

One staff member of the Capitol's pest-control program admitted there was a roach problem, but went on to claim that it was "no greater than that of any other public building."

One must respect these almost universally despised insects, not only for this rare instance of political clout but for their sheer staying power. Their fossilized ancestors have been found preserved in the Pennsylvania

Color drawings by John Huehnergarth

coalbeds formed in the Carboniferous Age, and in the intervening 250 million years the cockroach has changed little in its basic form.

A highly adaptable animal, most species prefer humid tropical climates; nevertheless, roaches have been found from the Sahara to Labrador quonset huts. They have flown in jets, blundered into skyscrapers and stowed aboard submarines. And if the roach has changed little, it certainly has proliferated. There are some 3,500 described species (an additional 4,000 are as yet unnamed) in the world and at least 53 of them are to be found in the United States. Of these, all but a few are unobtrusive outdoor types.

Among the few species that have moved in with Man, the National Pest Control Association says that its most intransigent adversary is the German cockroach *(Blattella germanica).* It is pale, yellowish-brown, measures about one-half inch long, likes kitchens and closets, and travels under a variety of aliases. The Germans are affronted and call it the Russian roach, and the Russians in turn call it Prussian. The English have named it the shiner or steambug, while some New Yorkers know it as the Croton bug because pipes from the Croton Reservoir were thought to have sped its migration to surrounding areas.

The largest of our common "domesticated" varieties is the American cockroach *(Periplaneta americana)* which measures about one-and-a-half inches long. British stevedores called it the "Bombay canary." It is reddish brown and likes sewers, damp basements, kitchens and restaurants. "We have them in our cafeteria," confided one entomologist with New York's American Museum of Natural History. Domestic cockroaches are not known for their flying ability but twice he has seen an American roach fly through the open window of his 15th-floor New York apartment.

Telephones and TV sets

A large roach—up to two inches long—has in recent decades established a beachhead in New York City, but as yet it is not a national infestation problem. Known as the Madeira cockroach *(Leucophaea maderae),* it made its way circuitously to our shores in the 1940s on ships via West Africa, the West Indies, South America and Puerto Rico. When disturbed, they make a high-pitched sound and emit an unpleasant odor. Its main contact with Man, so far, has been in the laboratory where its large size, among other attributes, makes it a useful experimental animal.

A special problem to TV repairmen is the brown-banded cockroach *(Supella longipalpa).* About a half-inch long, it has learned to crave the paste, glue and insulation in television sets, where it finds not only food but warmth. It may not venture out into the kitchen even for water, since it can in all probability metabolize enough from its food.

"You wouldn't believe the numbers of cockroaches that get into the telephone," says Dr. C. Douglas Mampe, technical manager for the National Pest Control Association. "It's a serious problem in inner city areas. Telephone companies have given instructions to their servicemen in these areas to carry plastic bags and when they find a phone with its bell mechanism jammed because of its roach inhabitants, to bag it, install another and take the infested equipment directly to the shop."

In fact, roaches generally like electrical appliances,

From the moist end to addiction.

mainly because of their warmth. The kind that run 24 hours a day are the most popular, such as refrigerator motors and electric clocks. "It takes only one roach to foul a computer," says Dr. Mampe. "If he gets into the right spot, he can short out a circuit somewhere."

A key to the common roach's extraordinary adaptability is its omnivorous appetite. It eats anything organic—shoes, glue, soap, postage stamps, book bindings, cardboard, wood, toothpaste, starched curtains and hairbrushes, to give only a partial listing.

Leland Howard, former chief of the Bureau of Entomology of the U.S. Department of Agriculture, once described a roach "of the usual inquisitive turn of mind" which lived in his desk. When he put his cigar down on the edge of a drawer, the roach came out and started munching on the moist end. At first it was after the moisture, but later it developed a taste for the tobacco and became addicted to the habit, apparently with "no appreciable effect on its health."

Cockroaches also have a predilection for fermented substances, enjoying the fermented sugar in cookie and cake crumbs and pop bottle residues. Also, they are inordinately fond of beer, and some people try to control roaches by leaving beer overnight in deep dishes. Once in, they can't get out—and drown. Several years ago, a graduate student at Oklahoma State University decided to determine authoritatively which beer they preferred. Pabst Blue Ribbon won handily over the eight others tested.

Unfortunately, there are very few animals that like to eat roaches, principally because of their malodorous secretions, a defense mechanism. One roach species, *Diploptera punctata,* sprays attacking ants with a quinone substance which causes them to experience abnormal seizures and uncoordinated leg movements.

Yet two more factors, speed and mobility, assure the common roach's success. The body is smooth, hard to grasp and can slip into small crevices. An American naturalist, Ronald Rood, claims that it can run 50 yards in one minute on smooth pavement, and can even run flipped over on its back, proceeding in a rowing fashion. Also, should a young roach be nabbed by the leg by a hungry pursuer, the pursuee will give it up and regenerate another one. And when all else fails, some roaches can depend on their wings to carry them to safety a few feet away.

In addition to speed, the roach's reaction time is extraordinary. Its body has a pair of cerci on the tip of its abdomen which senses vibrations, low sounds and wind currents. Experimenting with roach reaction time, Kenneth Roeder of Tufts University placed some on a treadmill which was attached to a delicate recording device. Just behind the roach was a small tube through which a jet of air was blown at the cerci. Dr. Roeder determined that it took about .05 seconds from air puff to leg movement.

Many of the very characteristics that make the roach so successful also recommend it as a laboratory animal for research into nutrition, metabolism, genetics and cancer. It requires little space and water and lives comfortably on dog food pellets. Dr. Shepherd Roberts of Temple University likes them because they are unusually hardy: "You can do radical surgery without their dying on you." They are disease resistant, so surgical instruments need not be sterilized, and the Madeira roach is large enough to insert electrodes into various parts of its brain. Dr. Roberts has been doing just that ("all you need are pin-sized instruments, a low-power microscope and a steady hand") in order to

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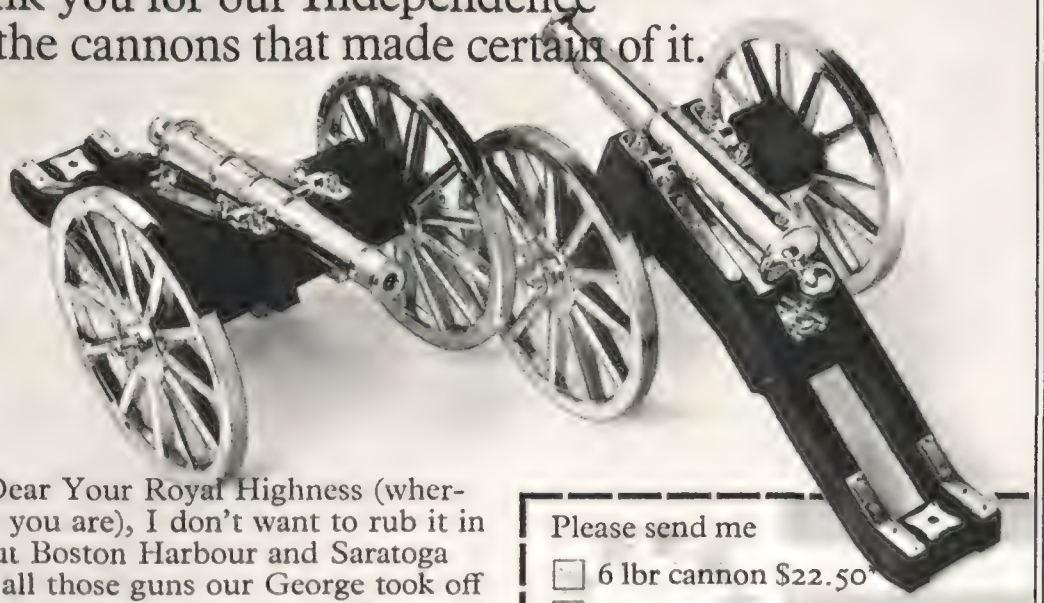

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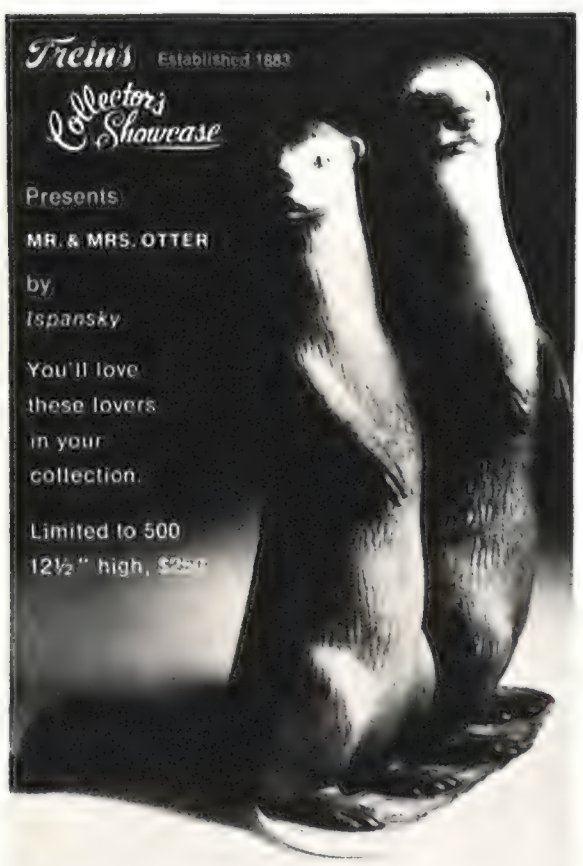

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explore the roach's biological rhythms.

In research at the Department of Agriculture, roaches have been found to be most susceptible to insecticide at 4 P.M. Dr. Roberts' work indicates that the roach's biological rhythms are intrinsic, rather than the result of clues from the environment such as the day/night cycle. He put roaches on small exercise wheels enclosed in boxes where the environment was controlled: Temperature and darkness, for example, remained constant. Free of such external stimuli, the animals maintained a regular cycle of exercise and rest. Roberts believes a pacemaker mechanism exists within the optic lobes of the roach brain.

On the other hand, a minority of experiments in biological rhythms maintain that they are subtly cued by some unidentified factor in the environment (perhaps the Earth's rotation or its geomagnetic pull) that cannot be excluded from the controlled environment boxes. (Because the lives of all creatures seem to be regulated to some extent by biological rhythms and since in humans these rhythmic cycles appear to have much to do with both mental and physical disease and treatment, it is important to know the source of the rhythm.) Dr. Frank Brown, a comparative physiologist at Northwestern University speculated that animals might have to be shipped into independent solar orbit to escape the natural periodisms of the Earth's electromagnetic rhythms. Indeed plans were made to send cockroaches into outer space

Cleanliness doesn't mean roachlessness.

They come free with the groceries.

just so such rhythms could be studied, but the experiments were ultimately scrubbed—perhaps a wise thing considering the roach's adaptability.

Even the most enthusiastic cockroach experimenters, however, are aware that their subjects are pests. Many laboratory workers experience violent allergic reaction to them: The roach allergen is contained in insect secretions. According to a scientific paper entitled "Cockroach Asthma," one unfortunate entomologist "was obliged while dissecting cockroaches to wear a gas mask and rubber gloves to avoid 'terrible fits of asthma and itching eruptions of hands.' "

In one study 181 asthmatic children were tested with sterile extracts of cockroaches which had been ground in a Waring blender. Thirty percent of the children tested showed positive skin response to the cockroach antigen. The study concludes that "the cockroach may act as an allergen, and may be a precipitating cause of bronchial asthma in some fragments of the population. Positive skin tests using insect extracts support the concept that insects may be the cause of respiratory allergy."

In addition to being allergenic, roaches have been found to harbor four strains of poliomyelitis virus as well as 40 different types of pathogenic bacteria, including typhoid and dysentery. Nonetheless, the cockroach has not yet been positively linked to the dispersion of any human illness, though they are certainly implicated. For example, in 1957 a housing project in Carmelitos, California, had nearly 40 percent of the hepatitis cases

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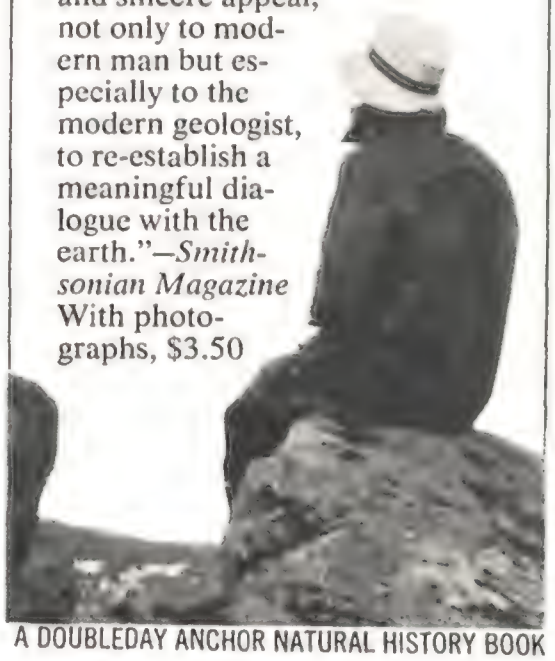

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in the Bellflower Health Area. After a vigorous two-year roach-eradication program in the community, Dr. I. Barry Tarshis, then of the University of California at Los Angeles, found that hepatitis cases had been reduced to less than seven percent in 1960 and none was reported at the end of the survey in early 1962.

Theodore A. Olson of the University of Minnesota's School of Public Health found that roach-spread salmonella bacteria lived on "dishes for 44 days, cornflakes for 62 days, and soda crackers for 88 days." From these findings he deduces that many cases of food poisoning may originate not with spoiled food but with the roach-spread bacteria.

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Such evidence, though circumstantial, is plenty for most people; virtually no one wants them around. Right now, the battle for control is a standoff.

"We may never win," says Dr. Mampe of the National Pest Control Association, pessimistically, "and not because we don't have the technology, the tools and the chemicals to control the roach effectively. The reason we can't is the people problem." The creatures are usually pests in multiple unit dwellings and every unit must be disinfected if they are to be eliminated. But there is always the holdout tenant who refuses for a variety of reasons to allow spraying in his apartment.

While the large food retailers take vigorous steps to eliminate the insect along all the lines of distribution, the local "mom and pop" store is often the unwitting purveyor of roaches along with groceries. Then, when you take back those empty soft-drink bottles, empty except for a few of the scavengers, you return the favor.

Neither is cleanliness the be-all and end-all of the cockroach problem. Dr. Mampe insists that sanitation only keeps the roach population from getting extremely large but will not eliminate them. Even some of the worst infested apartments he has seen have been "respectably clean."

Chlordane was once the principal weapon for control. However, in March 1952, it was reported that the German cockroach had developed resistance to it. Currently diazinon, chloripyrifos and propoxur are the big chemical guns in the antiroach arsenal, and some resistance has developed to diazinon although it still remains effective.

Biological control is impractical. Sterilized males could be introduced into an infested building, but this method takes weeks and plagued apartment dwellers are interested in immediate results. Some roach enemies could be introduced—hedgehogs, tarantulas, centipedes and red mites—but the cure might be worse than the disease.

If all else fails, you could, in desperation, fall back on the folk remedies that were reported by Frank Cowan in 1865 in *Curious Facts in the History of Insects.* Hold up a mirror in front of roaches and "they will be so frightened as to leave the premises." Or you may "address these pests a written letter containing . . . words to this effect: 'O, Roaches, you have troubled me long enough, go now and trouble my neighbors.' "

As the struggle continues one should think with a certain admiration of the roach's staying power and remember the words of the world's most famous cockroach in *archy and mehitabel*:

> i do not see why men
> should be so proud
> insects have the more
> ancient lineage
> according to the scientists
> insects were insects
> when man was only
> a burbling whatisit

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Book reviews

A Walk through Europe
John Hillaby
(Houghton Mifflin, $6.95)

Those seemingly indestructible feet, an insatiable curiosity fed by scholarship, and a near mania for flowers, stars, winds, landscapes and life have carried John Hillaby on yet another walk that might bring foot itch to homebound people everywhere. His earlier readers went on *A Walk through Britain,* a book that proved how many wonders most travelers by any conveyance miss. Now in his latest, his tramping about is so extensive that one wonders how he found the endurance, how, in frequent travail, he sustained his excitements and where he got the shoes and tough trousers.

Hillaby, a biologist and former newspaperman, with the scholar's wide brow, heavy white hair styled by winds and a fussed-over short beard below a chin hard as a post-office safe, walked about 1,300 miles in 67 days from the North Sea to Nice, beset en route by saturating rains, tormentingly polite bankers, a few surly passersby, the Alps, scatterings of hippies and the depression of seeing natural beauty die under onrushes of pollution and industrialization.

Why does Hillaby choose to walk? He says something once about "independence"—maybe meaning self-sufficiency.

His planned but flexible route took him down through Holland, Belgium, along the edges of Luxembourg and Germany, and continued on to France, Switzerland and Italy. The difference between Hillaby's journal and blabbermouth travelers is that Hillaby's sensitized mind and homework produced thoughts. He observed little things like elusive birds, rocks and flowers, stars and waterways—opened them to *meaning* and in doing so becomes entrancing. He can write: "I took to the Our, which at the frontier is a mere *schlinder,* a rivulet, but as pretty as a maid in a miniskirt. And as slim—in places you can jump from one bank to the other. But after a few miles she deepens and begins to take her frontier duties more seriously."

Hillaby embellishes his narrative, but not unbearably, with facts. His writing technique quickens a ready interest—or an urge to skip. For example, just after some statistics on windmills, he relates their uses from earliest times, and these flashbacks are consistent with almost whatever he touches—extending to birds, botany and the history of the peoples. This reviewer found it highly informative. Others may think it interrupts the narrative.

The intensity of Hillaby's philosophical walkalogue deepens with the tramp about the Alps. And there, for once, the reader is happy to be at home and not with Hillaby. He is sometimes lost, his life too often endangered. Otherwise, every bunion-piercing step would have been pure joy—if Hillaby talks as well as he writes.

The journal is witty, wise and even comforting. It proves that "independence" continues possible. Because a sturdy and perceptive person can own his life and, if he is also brave, can slam one of those tough-soled shoes into the backsides of material conformity.

So walk on, Hillaby, with the winds in your hair.

—*Scott Hart*
Co-author of SMITHSONIAN article on soldier songs, July 1971

The American Film Heritage: Impressions from the American Film Institute Archives
Tom Shales and contributors (Acropolis Books, Ltd., $17.50; $4.95 paperback)

A shocking revelation is in store for readers of this collection of essays, most of which are inspired by the films preserved in the American Film Institute in Washington, D.C. And the shock comes early in the book, with Gregory Peck stating in his foreword that more than half of the nation's film heritage is lost. It has disappeared because of the self-destructive

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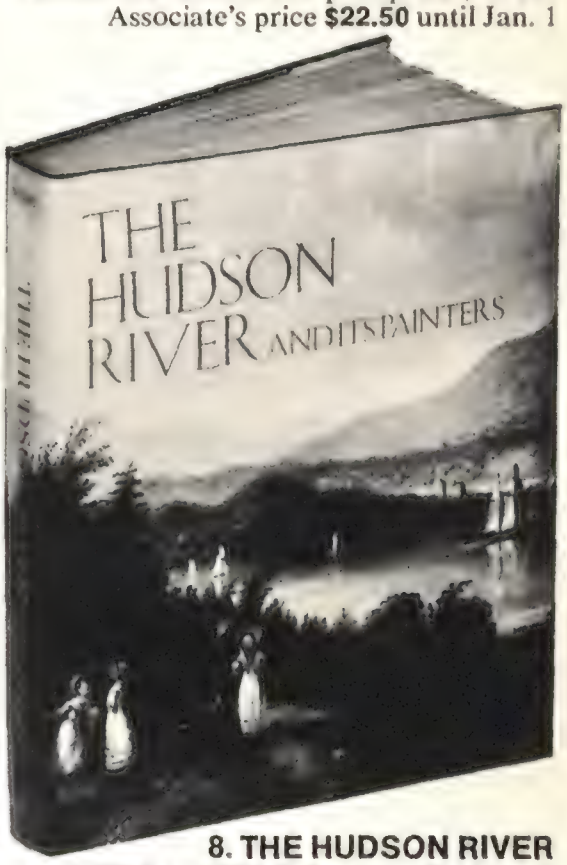

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nature of the nitrate film used prior to the Fifties and because of producers' interest in looking ahead, rather than preserving the past.

Since its founding in 1967, the American Film Institute has embarked on several successful film rescue missions, some of which are chronicled in the book. The AFI has managed to secure quite a few films that were presumably "lost." Other films "survive" through diligent restoration efforts, such as the collating of a group of incomplete prints and sound tracks. An original version of *The Emperor Jones* (1933) was reconstructed by piecing together bits and segments of several surviving 16 mm prints. When the AFI discovered that the sound track of *The Front Page* (1931)—acquired from a foreign archive—was poor, it substituted a superior track off some Vitaphone discs that were borrowed from a San Francisco collector.

One of the Institute's most valuable windfalls came unexpectedly from Mary Pickford. Since 1922, she had owned 80 of the 105 films (most of them directed by D. W. Griffith) that she had made for Biograph, having bought them to prevent others from capitalizing on their re-release. It was evident that they had been kept in perfect storage condition when, in 1969, she allowed the AFI to make preservation copies, thus contributing to the 9,000 films which the AFI now has.

The 34 chapters of the book—one-third of them written by *Washington Post* and National Public Radio film critic Tom Shales—are also filled with nostalgic side-

Hal Roach's "Our Gang"

bars about the infant years of the American film industry. The volume describes the hordes of entrepreneurs that "rose out of their holes in the ground" and set up film companies in places such as Wilkes-Barre, Pennsylvania, and Saranac Lake, New York. Men of dubious character ran these firms on the medicine-show principle, and the town inhabitants bought into new movie companies that disappeared into the night.

The book offers some illuminating remarks and anecdotes from Hollywood directors. Frank Capra, for instance, director of films such as *Mr. Deeds Goes to Town* (1936) and *Mr. Smith Goes to Washington* (1939), went about telling his grass-roots success story of a hero struggling up, keeping his meat-and-potatoes values, and puncturing balloons of elegance and pomposity. Although one critic calls a film "Frank Capracorn" when unwarranted hope runs rampant, Capra preferred being "of the 'upbeat' school" rather than an "ashcan" graduate, depicting life as "an alley of cats clawing lids off garbage cans, and man as less noble than a hyena." Because he was often bored with his job by noon and would ask someone else to take over, Hal Roach, who made two-reel comedies a fine art, launched many movie-directing careers.

Two of the essays shed considerable light on the way films reflect (and distort) political and social attitudes. *Mission to Moscow* emerged in the spring of 1943 as one of the strangest documents of our political and cultural history. In it Stalin becomes "Uncle Joe." Walter Huston,

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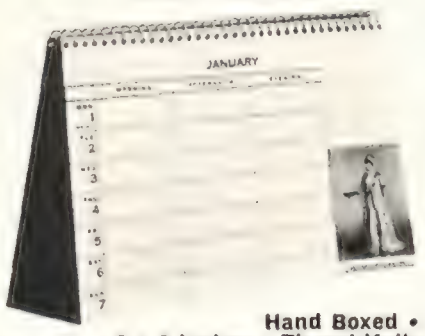

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(signed) Joseph J. Bonsignore
General Manager

playing U.S. Ambassador to the Soviet Union Joseph E. Davies, instructs, "How they keep their house is none of our business. I'm concerned with what kind of neighbor they'll be in case of a fire." David Thaxton, AFI associate archivist, claims that the film even tried to justify "the 1937 purge trials, the Nazi-Soviet Non-Aggression Pact and the Russian occupation of Finland—suggesting there was no difference between the United States and the Soviet Union."

Stephen F. Zito, editor of the *American Film Institute Catalog*, writes "The Black Film Experience," a chapter which the reader won't easily forget. "The image of the black man in the American film has changed radically in recent years," he begins. "The invisible man has become visible, and all the good gray Toms and shiftless Rastuses of yesteryear have quit stealing chickens and are out making it with white women and cutting up Mafia hit men. A first generation of black superstars has been born and is playing out a new collective role—that of the Negro as street fighter and hustler, a high-style achiever who overcomes a hostile world by means of street cunning and a strong arm." He goes on to say that such recent films as *Shaft, Cotton Comes to Harlem,* and *Sweet Sweetback's Baadasssss Song* "represent the first viable expression of ghetto experience in American films."

In earlier films the Negro played three roles—the savage, the fool and the castrated uncle. Stereotypes were created out of a few histrionic elements, notes Zito: "the shuffled step; the molasses-slow, stumble-tongued patterns of speech; the razor in the torn pocket; and the watermelon grin." The Negro actor provided humor merely by being black. During those early years 500 movie houses showed films "for colored only." These films, which were made outside of Hollywood, were as fantastic and contrived as the Hollywood product of the period. Even in these all-black features the good people are light skinned, the bad people dark complexioned.

This illustrated volume is not a definitive history of the American film as an art form, as an industry or as an historical and sociological document of the times. Nor does it pretend to be. The rescue missions of the American Film Institute hope to come up with a lot more material before such a definitive history is written. Many of the above impressions from *The American Film Heritage* will probably find a place therein. In the meantime, they should enrich viewer appreciation of yesterday's silents and talkies and today's film efforts as well.

—Angèle de T. Gingras
Washington correspondent for *Hollywood Reporter*

Debuts & Farewells: A Two-Decade Photographic Chronicle of the Metropolitan Opera
Paul Seligman
(Knopf, $15)

Were it not for a fortuitous summertime encounter 19 years ago between the author and two prominent Metropolitan Opera figures—diva Risë Stevens and assistant manager Francis Robinson—this loving portfolio of memories might never have appeared.

Out of Paul Seligman's interview with a reigning mezzo of her day came an unofficial entrée from Robinson to photograph at will backstage and on tour. Years later, in the 1960s, it was to result in a continuous assignment from *Opera News* for Seligman to photograph complete operas during dress rehearsals.

The past two decades have been a mixed blessing for the venerable company. Met devotees will recall the inglorious death of the old house, the feuds and wage disputes and the numerous departures from the scene. But there were many newcomers to offset the losses, as well as such stellar attractions as Maria Callas, Joan Sutherland and Leontyne Price. And there were exciting new productions, and—topping everything else—a sparkling new house.

Seligman's photographic collection is majestic, yet, at the same time, thoroughly human as grand poses in costume alternate with candid scenes of spontaneous emotion. In fact, one's sole regret is that the book, with more than 280 photographs, isn't twice as long.

—Michael J. Bandler
Free-lance literary commentator

From the Land and Back
Curtis K. Stadtfeld
(Scribner's, $6.95)

Out of the great clouds of anomie that have gathered over American society in recent times has poured a Texas-sized cloudburst of commercial panacea de-

signed to appeal to the grass-roots yearning for another time, another place, another cultural context.

Most of the back-to-nature books have been pretty dreary: romantic drivel by city folks; handy-dandy manuals that answer such thought-provoking questions as "Where to Put the Septic Tank?"; Woodstockian picture tomes designed to appeal to people whose major contact with nature apparently is having once seen a horse while driving through Pennsylvania.

Against this drab backdrop, Curtis K. Stadtfeld's *From the Land and Back* comes across as fresh as a long sip from a cool farm well on a hot July day. Stadtfeld knows what he is talking about and he says it in a way that cuts through the poetry of the experience to the reality. Of his central Michigan homeland, he writes: "That lasting sense of place was built into the men and women who grew up in the area. The hills and forests wrapped around them, measuring their space and adding to the sense of lasting security."

That security is gone now and that is precisely what the book is about. Technology, the lure of the cities, the lure of commercial prosperity, the consolidation of small farms into large businesses, have all combined to destroy this special way of life. Stadtfeld's childhood world—and, incidentally, mine—was a world in which "huge barns . . . came to be measures of the size of the farmer's dreams." It was a world in which all major issues seemed black and white, never gray, a world which was as certain and as sure as the changing of the seasons.

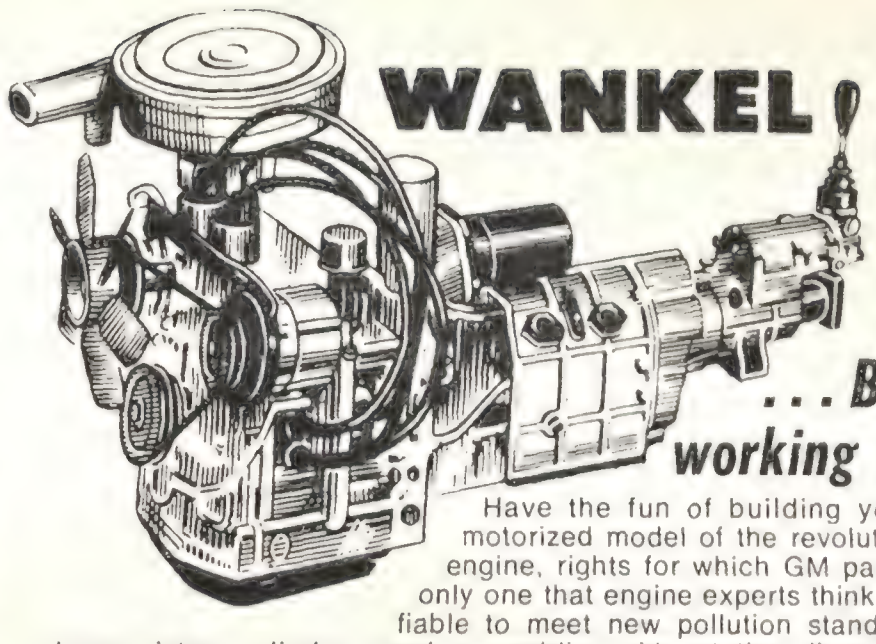
For me, reading this book is once again to step out from under heavy quilts onto a winter-cold floor while the only heat in the house is the small glow of red in the belly of a coal stove several rooms away; to feel the insulting swipe of a muddy cow's tail in your face as steam rises from a warm milk bucket; to smell a freshly killed hog as his belly is split open.

I don't think it's the kind of life anyone really wants to go back to. But it is true, as Stadtfeld concludes, that, having once lived on the land, the experience never stops being a part of you.

His is a beautiful and moving piece of writing.

—Jerry G. Bowles

Free-lance journalist who has written for *Esquire* and *Saturday Review*



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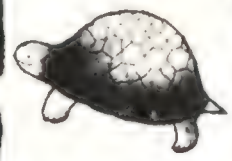

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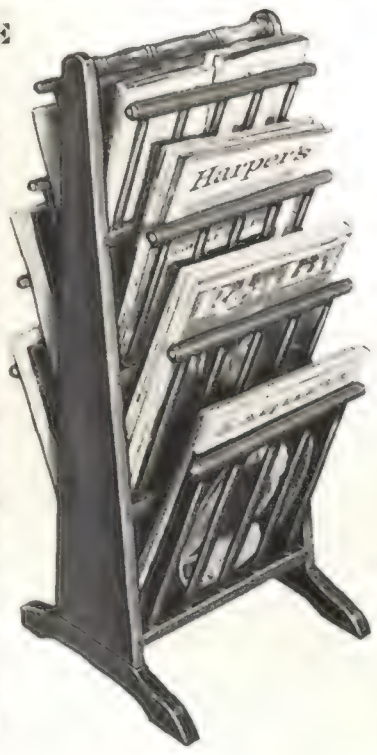

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Smithsonian highlights

Division of Performing Arts
The Modern Jazz Quartet, called "the most accomplished small ensemble in jazz history" performs at 8 P.M. on December 10, Baird Auditorium, Natural History Museum. Call (202) 381-5395.

"The Hullabaloo Election of Osbert or Jess" continues at the puppet theater until December 10. On December 20, the puppet theater moves to the Arts and Industries Building, and a new production is introduced, "Skazki—Tales from Old Russia." For time and ticket information, call (202) 381-5395.

Museum of History and Technology
"Stamps and the Mails" depicts the history of the U.S. postal system.

"The Character of the Old West," a new unit in the Hall of Everyday Life in the American Past, provides flavor of the American West with exhibits ranging from an original gold nugget and Wyoming cowboy outfit to full-scale facade of an 1890 California butcher shop.

Museum of Natural History
"The Splendor of British and European Butterflies" is demonstrated in original watercolor paintings by London artist Brian Hargreaves.

Smithsonian Building
"The Publication of the Joseph Henry Papers," celebrating the publication of the first volume of Henry papers, recalls with manuscripts and artifacts Joseph Henry's early years up until 1846, when the Princeton professor of science became the first Secretary of the Smithsonian Institution. Opens December 17.

"The Architectural History of the Smithsonian Institution Building" is captured in a series of photographs that show the architectural history of the "Castle." Opens December 17.

National Portrait Gallery
"The Lazzaroni" features portraits, letters, documents and equipment of the small group of intelligentsia—mostly scientists—which dominated the American scientific community in the mid-19th century. Opens December 26.

Renwick Gallery
"Brazilian Baroque—Decorative and Religious Objects from the 17th and 18th Centuries," sponsored by the Brazilian embassy and the government of the state of Sao Paulo, includes such objects as candlesticks, goblets, crowns, cornices and altars from Brazil's colonial period. Opens December 22.

Arts and Industries
"Apollo 17 Mission Highlights" includes a lunar map and photographs of personnel involved in the last scheduled launching of an Apollo moon mission.

Anacostia Neighborhood Museum
"Black Santa" arrives via helicopter in mid-December for a two-week visit.

National Collection of Fine Arts
"Recent Accessions" features prints, drawings and watercolors by such artists as George Bellows, Edward Hopper and Charles Sheeler, through January 1.

"Wonder Production—Volume I" traces the evolution of an idea and the development of a book of lithographs by Chicago artist Ellen Lanyon, through January 3.

"Modern American Art Works" highlights an early William de Kooning—*The Wave,* Andrew Wyeth's *Dodges Ridge* and a number of works from the S. C. Johnson collection. Opens end of December, Special Exhibition Galleries.

Special Program
"Washington Art Scene," produced by Radio Smithsonian and radio station WGMS, features the *Star-News* art critic Benjamin Forgey commenting on art events and artists in the Washington area. The ten-minute show is broadcast every Wednesday at 4:30 P.M.

Traveling Exhibition Service
There are up to 70 different Smithsonian-sponsored exhibitions on display each month throughout the United States and Canada. For a complete listing and information on how to bring an exhibit to your area, write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

- San Diego, Calif.—"Royal Festivals and Romantic Ballerinas" (Fine Arts Gallery of San Diego, Dec. 9-Jan. 14).
- Montclair, N.J.—"The Monotype: An Edition of One" (Montclair Art Museum, Dec. 2-31).
- Halifax, Nova Scotia, Canada—"Education of an Architect: A Point of View" (Nova Scotia Technical College, Dec. 16-Jan. 14).
- Beaumont, Tex.—"Peter Max (I)" (Beaumont Art Museum, Dec. 9-Jan. 7).
- Oklahoma City, Okla.—"Portraits by Belgian Children" (Oklahoma Art Center, Dec. 16-Jan. 14).
- Muncie, Ind.—"Paleolithic Cave Paintings of France and Spain" (Ball State University, Dec. 9-Jan. 7).
- Orlando, Fla.—"Meteorological Optics" (Central Florida Museum and Planetarium, Dec. 9-Jan. 7).

Smithsonian Commons
Luncheon facilities for members of the Smithsonian Associates are in the original Smithsonian Building. Open weekdays from 11:30 A.M. to 2 P.M., the Commons offers a buffet luncheon from $1.40 to $1.85 upon presentation of an Associate membership card.

Museum Reference Service

The Smithsonian Associates have inaugurated a new service known as the Smithsonian Associates' Museum Reference Service. Members traveling within the United States may write for a folder comprised of lists by states of many of our country's museums, galleries and historical sites. Brochures are included when available. Specify the states in which you will be traveling and subjects of interest. Allow three weeks for mailing. Write: Smithsonian Associates' Reception Center, Smithsonian Institution Building, Washington, D.C. 20560.

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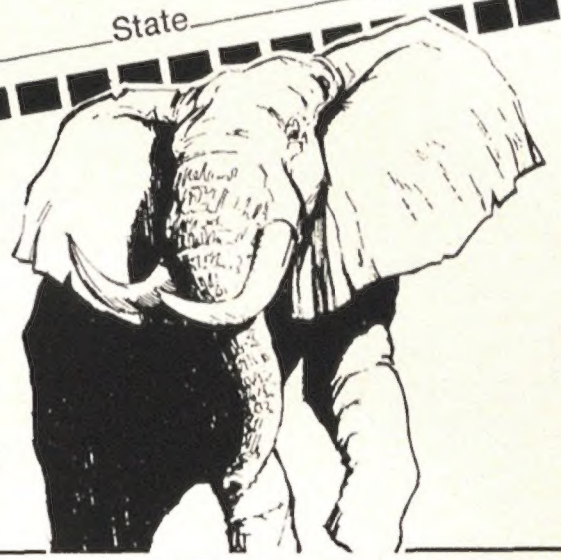

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By Patrick Ryan

Soothing sand for tense tycoons

On the subject of masculine relaxation, it does seem passing quaint to observe a *Playboy* endorsement of sand as a soothing agent for overstressed businessmen, when the stuff has been principally noted as an abrasive of timber, a saboteur of machinery, and a pitiless ingredient of desert simooms. Recently offered, at a price of $10, was an executive sandbox that is described as "a soothing desk accessory for harried executives" who can "use the free-form digging tool . . . or simply run [their] fingers through pure white quartz sand encased in its own black wood-grained plastic sandbox (12 inches x 12 inches x 5 inches)."

While personally blanching at the prospect of anything in black wood-grained plastic, I must in fairness record that the emollient use of silica grits has also been supported by Opus International of Toronto. This organization earlier marketed in the United States sandpits, 15 inches high and 42 inches square, as "creative pieces of furniture" for executive suites and as "an excellent pacifier" for tense tycoons.

It is suggested that rat racers anxious to stave off nervous tics, second coronaries or third ulcers seek relaxation by taking off their shoes and socks, sitting on the teak, rosewood or walnut veneer surround, and wiggling their toes in the soothing sands. An added but unadvertised advantage is that when overworked vice presidents grow tired of putting golf balls along the carpet, they can vary the grueling day by practicing bunker shots out of their executive sandpits.

This search for adult pacifiers to bring sweet placidity to troubled minds has been with us down the years. The Greeks and Arabs have long carried their worry beads about them to give tactile solace at any time of day. Captain Queeg adapted their tradition to modern technicality by resorting to his handful of steel ball bearings when faced with critical decisions or Fred MacMurray.

In the hectic pursuit of relaxation, the national expenditure on alcohol is perhaps matched only by the Mount Everests of tranquilizers that disappear daily down human esophagi. The total of man-years spent in search of serenity by talking to bankrupting psychiatrists is rivaled only by the collective centuries devoted to seeking mental vacuity watching age-old movies on television.

Maharishis who seem to spend less time in mysterious India than in advertising photographers' studios make fortunes persuading people that composure of the cortex can be achieved by meditation. And suntanned gentlemen with a gift for contortion do equally well at the bank by convincing others that peace can come through yoga, a practice in which the limbs are twisted into positions of such complex discomfort that all worries flee the mind because the immediate concern is how the hell you're ever going to get yourself untangled.

Sadly deprived of such high-priced relaxants, I have perforce become accustomed to cooling the incandescent mind with philosophical aphorisms.

During minor perils of war, sanity was notably assisted by a Tao-tending brigadier who kept on his folding table a paperweight in the semblance of a small black coffin. When, at ever-returning crises, I and the rest of his underlings essayed to take refuge in flap, panic or hysterical bedlam, he would turn the coffin over to display the white-embossed declaration: "Nothing in the End is of the Slightest Importance."

A cosmic perspective on terrestrial troubles can help: One highly educated acquaintance kept upon his mantel a globe that spun to point out that there are billions of people on this planet, billions of planets, and billions of galaxies . . . so, who, my friend, are you or I? But no wry dictum has served so well to raise me up from rock bottom as the assurance of Virgil that, however virulent one's life may now be, "The day may dawn when this plight shall be sweet to remember."

As plight has inexorably followed plight in my unfairly allotted span, this proposition has been so repeatedly proven that I can always take comfort in any prevailing tribulation. If, unfortunately, you should find that such gentle words as I have quoted bring you no tranquillity, I can only in extremis suggest that you forthwith stay yourself with appropriate flagons, ask a nudie magazine to send you a topless blond to massage the knots out of your neck muscles, and follow a modernized version of Thomas à Kempis' advice and just quietly "Take up your cross and relax."

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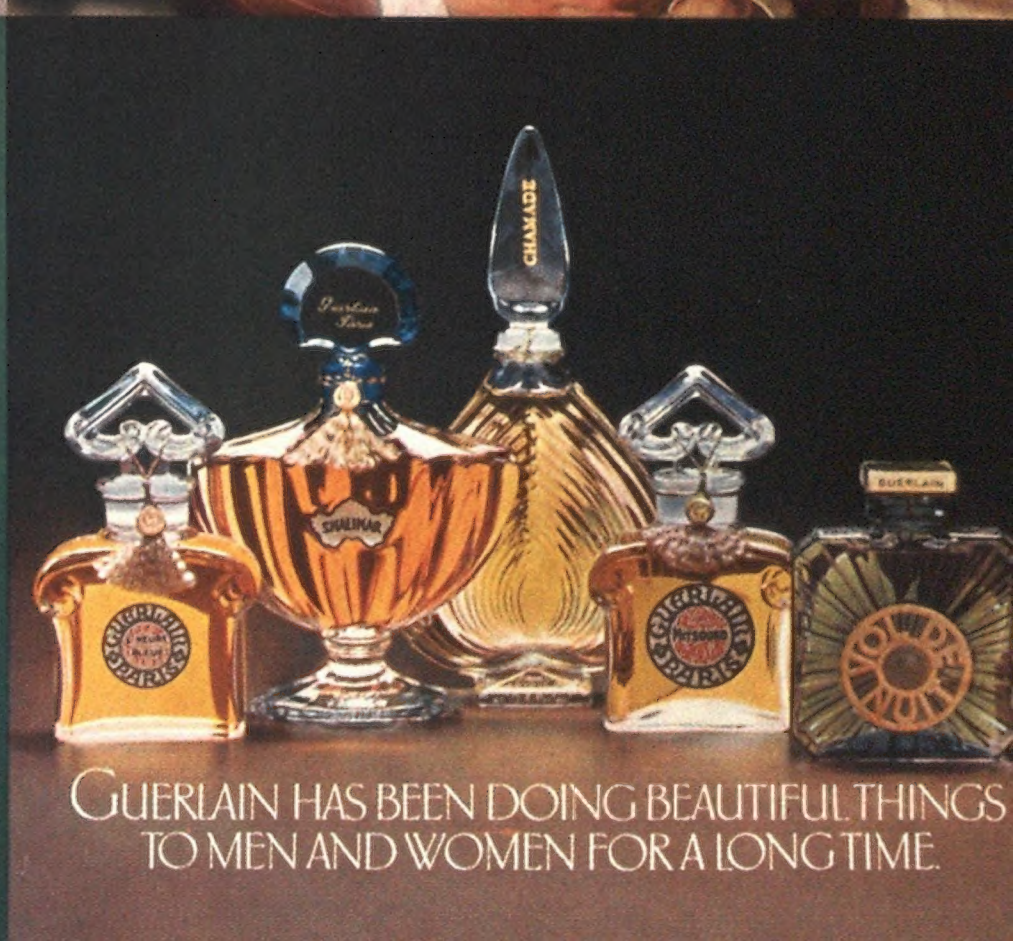
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